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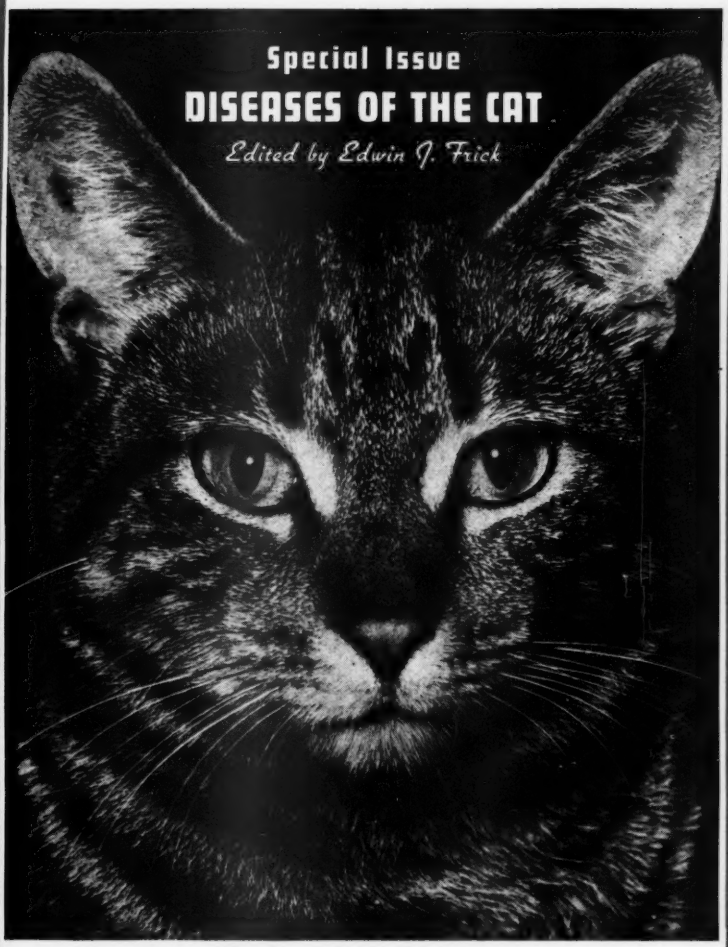

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VETERINARIANS!

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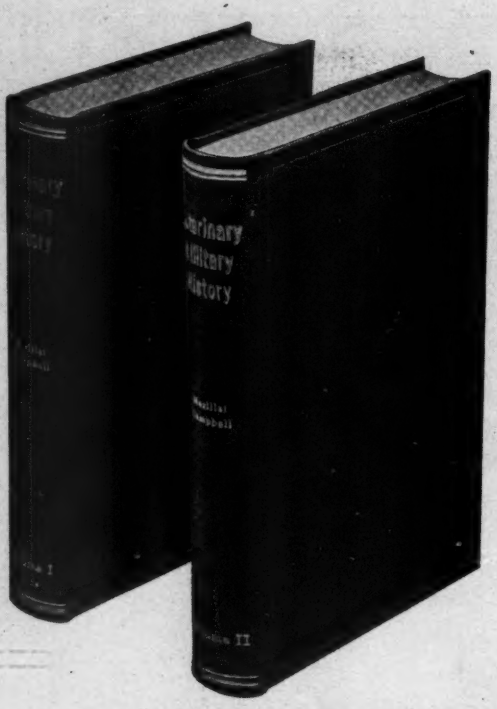
Veterinarians wrote this History
All Veterinarians should read this History



Few things in human life are either entirely good or entirely bad. Few things are either black or white. It is the duty of the honest chronicler to give a true account of all the good and bad sides of every historical event.—*Hendrik Van Loon.*

We know ourselves better the more we know of our heritage.—*Guy Stanton Ford.*

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PUBLISHER'S NOTE—For lack of space, we are compelled to postpone until later issues, the publication of several articles prepared for this special issue, including: The Cat in Its Relation to Plague, by Karl F. Meyer; Haff Disease in Cat and Man, by F. Volkmar; Dentition in the Cat, by E. Harrison; Feline Auricular Mange, by C. W. Schultz; Foreign Bodies; Lymphatic Dermatitis of Cats; Leucemia and Pseudoleucemia in Cats; Roentgen-Ray Therapy in Cat Practice; Occurrence of Tumors in the Cat; Catheterization of Cats; Tooth Extraction in the Cat; Tetanus in the Cat; Laryngoenteritis in a Cat; Tuberculosis of Cats; Pseudotuberculosis of Cats; Estrum, Its Hormonal Stimulation and Suppression; Diseases of the Genital System; Protozoan Diseases of Cats; Poisoning in Cats; Rabies in the Cat; Infectious Bulbar Paralysis; Diaphragmatic Hernia in the Cat; Hemorrhagic Septicemia of Cats; Cystic Ovaries, and a Table of Feline Doses, etc.

The articles in this issue together with those prepared for it but to appear later, will be published in booklet form shortly for the convenience of those desiring a complete discussion of feline practice in a single publication. It will be supplied at nominal cost. Those wishing to obtain the booklet—Feline Practice—should reserve their copies now.

Early History of the Cat*

Whether it is the cat or the dog which is the most domestic of all our animals, is a moot question. The cat is certainly favored by that half of the human race more concerned with domestic cares, for it is a home-loving animal, exceptionally clean in its habits, and thus naturally commends itself to the good will of the thrifty housewife.

Our domestic cat seems to have come to us (like most if not all of our other domestic animals) from the East, and is probably a descendant of the old domestic cat of Egypt, which, as the granary of the ancient world, might well have been the country in which the animal was originally tamed.

In early Egypt the cat was an object of religious worship, the venerated inmate of certain temples, and an emblem of the sun to the Egyptians. Its eyes were supposed to vary in appearance with the course of that luminary and likewise to undergo a change each lunar month, on which account the animal was also sacred to the moon. Herodotus recounts instances of the strangely exaggerated regard felt for the cat by the dwellers on the Nile. He tells us that when a cat dies a natural death in a house, the Egyptians shave off their eyebrows, and that when a fire occurs they are more anxious to save their cats than to extinguish the flames.

A full history of the cat in domestication would make an absorbing tale. In Egypt she sat in the seat of the mighty. The cat was certainly domesticated in Egypt at least 1300 years before Christ, and probably her ancestors were wild hunting cats of Egypt.

All we know definitely, however, is that a small and common type of wild cat (*Felis caffra*) has been found throughout the length and breadth of the African continent, very similar in build to our domestic cat, but having a slighter body and possessing a longer but thinner tail. This animal will readily interbreed with our domestic cat.

Roman literature attests the very great care with which the cat was preserved. When rats and mice began to infest the human habitations of North Africa, Morocco for instance, and countries bordering the Mediterranian, the cat became an invaluable ally to man, and speedily grew in public favor.

It is highly probable that as the domesticated eastern cat was brought or spread from Persia or India into Asia Minor, it interbred with the wild species, and in this way originated the different varieties of the domestic cat as we know them today.

* * * *

Cats do not approach each other backwards, but the male stands erect, and the female places herself beneath him. The females are very lascivious, and invite the male, and make a noise during the intercourse.

Cats produce their young in the same manner as dogs, and live upon the same things. They live about six years.—*Aristotle's* History of Animals.

* * * *

The greater the number of cats the fewer the voles, the more bumble-bees, the better the clover crop, the richer the pasture, and the greater the production of beef. Our dinners, then, depend to some extent on the number of cats present.—*Darwin.*

* * * *

Cats, from their nocturnal rambling habits, cannot be easily mated, and, although, so much valued by women and children, we rarely see a distinct breed long kept up. Such breeds as we do sometimes see are almost always imported from some other country. Although I do not doubt that some domestic animals vary less than others, yet the rarety or absence of distinct breeds of the cat may be attributed in main part to selection not having been brought into play, from the difficulty of pairing.—*Darwin's* The Origin of Species.

* Blair, Wm. Reid, 1923. "Notes on the origin and development of our domestic animals." *Cornell Vet.* 13:200-207.

Cats Through the Ages

By FLOYD EDWARD MONROE.
Woodbury, New Jersey

CATS are among the oldest of our domesticated animals. From the most ancient times we have records of cats entering into the life of mankind. To the ancient Egyptians the cat was more than a pet, it was a god. On opening tombs of the great Pharaohs, mummified cats incased in elaborate caskets have been found sharing the splendor of those once monarchs. These people thought enough of their cats to dedicate a temple to Bast, the protector of cats. Warlike though they were, they often sent the bodies of their dead pets a long distance to be buried in this temple.

Down through history one will find the cat ever present. It is claimed by some, who should know, that under the manger in which the Christ child lay there was a mother cat and her kittens. Even Genghis Khan, the most deadly and blood-thirsty of all historical characters carried a cat in his saddle bags on his journeys through thousands of leagues of hostile territory.

"A ship without a cat is a ship without a sail" is an expression often used by old sailors. For some unknown reason cats take to the sea much better than dogs, and not only that, they are much preferred to dogs by the seafaring men. Don't think a seagoing cat is just another passenger, she earns her passage. If it weren't for her the rats would be even more of a menace than they are. You notice I say her. It is very peculiar that most of these voyagers are females. There are cases on record of these cats changing from ship to ship so as to stay on one particular run. Apparently they know where they want to go!

Of all our pets the cat is the most independent. Dogs often perish when their owners move on and leave them to the mercy of the elements, but cats provide for themselves satisfactorily. From a child's playful pet a cat can form into a hunter unsurpassed by any other creature. That is why this animal has survived through the ages.

The dog of today differs greatly from the dog of 200 years ago, because he is easily altered and changed by man. It is not so with the cat. They are the same as they were at the beginning of recorded history. They mold their own lives.

Cats have a commercial value. In Japan the government encourages the raising of these animals as a side line. The pelts of these cats are used to make inexpensive but warm fur coats for milady. They have another use in the production of furs, and that is as a foster mother. Often vixens die leaving their pups orphans; the loss of both dam and offspring would be quite a loss to the fur breeder, but "pussy" comes to the rescue by nursing the orphaned fox pups until they are old enough to take care of themselves. Cats have been known to raise young squirrels that had been orphaned, though I imagine that discipline becomes a problem when the squirrels become old enough to climb.

We often hear of dogs working with night watchmen, police or men on some other type of duty, but I have never heard of a dog that worked by itself and earned a salary. There are cats that are on the payroll of large corporations. The majority of the large chain stores have cats on their pay rolls.

United States Post Office regulations call for a cat to be free in the post office to help keep down rats. Evidently Uncle Sam appreciates the worth of cats.

There are many superstitions about cats; all false.

* * * *

In the Bible, cats are mentioned only in Baruch (6:22), an apocryphal book, sometimes referred to as "the epistle of Jeremiah." The context of the passage appears to point to a domesticated animal. Perhaps, the Babylonians, originally, procured the cat from Egypt.

Breeds of Cats

By EDWIN J. FRICK,
Manhattan, Kansas

THERE are over a hundred breeds of dogs in this country, and most practitioners handling small animals are familiar with the majority of them. There are but a few breeds of cats, yet comparatively few veterinarians recognize them.

There are several cat associations, perhaps the most prominent being C.F.F., Cat Fanciers Federation; the A.C.A., American Cat Association, and U.C.C.A., the United Cat Clubs of America. (Which is preferable is good for an argument at any cat show).

Probably around fifty shows are given in a year, the outstanding being in Detroit, Kansas City, Dayton, Springfield, Chicago, Los Angeles, Danbury and Westchester. As to the number of cats in this country there is no accurate figure, but it is estimated at 120 million. A further estimate is that somewhere from two-thirds to three-fourths of the cats in this country are "strays."

Cats sell for from $5 to rarely as much as $1500, with around $75 as an average for show specimens. The average stud fee for show stock is $10. A few outstanding champion sires command fees up to $50. The great majority of those persons who engage in cat breeding, probably do it as a hobby and are primarily cat lovers rather than commercialists. There are more women than men among the cat breeders in this country, although the reverse is true in England, where the best cats are raised. People who care for cats at all, really care for them violently, and the poor cat lover will deprive herself of necessities in order to pay for care for her cat.

The veterinarian who recognizes and makes allowances for the peculiar psychological characteristics of cats will be rewarded by response and appreciation of his endeavors, both from the patient and the owner. As a pet exceptionally clean and orderly in its habits, homeloving, useful and ornamental, there is no animal that equals the cat.

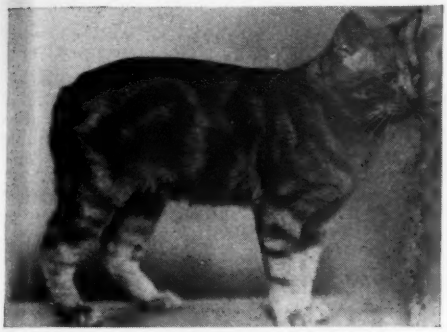
EDWIN J. FRICK

In general, cats may be grouped into two large classes: The short haired or European, and the long haired, or Asiatic. This division is not entirely satisfactory, but it has its practical advantages.

In the short-haired group, are included the common backyard, ash can variety of cat usually spoken of as "domestic short hair." It is generally considered only in terms of color such as black, white, tiger, etc., but in the show ring, the coat and eye color must conform to standards adopted for the long-haired breeds. One must not

expect to see in the domestic short hair the delicate shades that breeding has produced in the Persians. Tortoise shell short hairs are often called "calico cats," and short haired blues are generally known as Maltese. There are two other familiar short-haired breeds in this country aside from the domestic. They are the Manx and the Siamese.

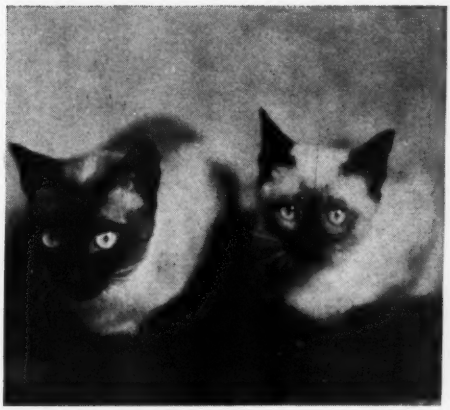
The Manx cat originates from the Isle of Mann and is usually tailless, but stubs or short tails appear in purebred litters. Manx cats must be absolutely tailless for show purposes. They are sometimes known as the rabbit cat. High hindquarters and short backs and the double coat of soft fur are also Manx distinguishing points.



Imp. Ch. Ginger of Manx of Glen Orry Red tabby, male Manx cat, originally from Isle of Man, four years old, weight 10½ pounds. Probably the most famous Manx cat living. Three times champion in Europe and Best Cat in the Show (Denmark and Paris) and champion in A. C. A., Best Manx in Canadian National Exhibition, Toledo and Chicago (1936); also Best Short Hair in Show (1937). Note the depression at the end of the spine. Owners: Misses Ruth & Ellen Carlson, Glen Orry Cattery, Glen Ellyn, Ill.

They come in all colors. The body formation is of most importance when being judged.

The Siamese, native of Siam, is a short haired, active cat with body colored a clear pale fawn. The face is a deep chocolate brown shading to fawn between the ears. The tail, legs and feet are brown. The eyes are blue, and the better the cat the darker the eyes. The kittens of Siamese cats are born snow white. There is also a blue-point Siamese in which the body is



Siamese Cats.

pale blue and the face, legs and tail dark blue.

There is a Malay cat with a kink in its tail that is commonly called Siamese, but true Royal Siamese cats have straight tails. Most of the cats in the Philippines are reported to have crooked or kinked tails. Only the Royal Siamese have their special coat colors in the short-haired breeds. The Manx and domestics conform to the long-hair, color standards.

In the long-haired cats we have various breeds, the Persian, Angora, Maine, Chinese, Indian, French and Russian. In recent years they have become so cross-bred in this country that the old line, true Angora, a white cat with angular head with one coat of long hair hanging in locks tending to a slight curl or wave on the underparts of the body, has as a breed entity been lost in inter-breeding with other long haired cats. By nature the Angora was not as amiable or affectionate as the Persian. It would bite or scratch without apparent provocation. Today the narrow Angora head is considered a blemish, and is seen only in poorer specimens of the long-haired breeds.

The Maine or coon cat found in the state of Maine and throughout the New England states, is a mongrel, long-haired and partly wild and is thought to have originated from the Asiatic breeds probably brought over by pirates. Being of a wild

Taj Da, by O'Shah. July 1935. Three weeks of age, extra fine specimen. Compliments of Helen Dow Whitaker, Kent, Wash.

disposition and not breeding true to colors, it is not a desirable pet. Of late, certain wealthy groups in the East have popularized its unusualness.

The Persian

From a point of beauty the Persian cat originating from Smyrna and the Persian coast stands preeminent as an adornment to any household. Its silky, uniformly long and abundant coat, broad, round head, wide eyes, firm legs, cobby body, kindly disposition, have made its characteristics the objectives of most breeders of long-haired cats of today. The color and condition of the coat is of major importance in evaluating the cat. The coat must be long, abundant, dense, soft in texture and double, consisting of a woolly undercoat and a long, hairy outercoat. In summer the undercoat is shed. On the shoulder and upper part of the hind legs the hair is shorter than elsewhere on the body. The hair around the neck, where the fur of the cheeks pointing downward meets that of the neck pointing upward, forms a frill or collar and is usually lighter in color. There are at least 14 varieties of colors. A solid color must be pure and even from the roots to the tip of the fur. Each coat has to have the proper color of the eyes accompanying it. The usual grouping of classes is as follows:

The Black Persian.—Dense, coal-raven black, free from any rusty tinge and full of luster, with eyes of an orange or copper color.

The Blue Persian.—A real blue, very pale shade, free from any admixture of

Ch. Midnight Mirth of Sleepy Hollow. Undefeated Championship won under three different judges. Best Black Male, Wichita, 1935; Best Black, Joplin, 1935; Best Black in Show, defeating 11 blacks, Kansas City, 1936. Sired "Best Junior Kitten," Minneapolis, and "Best Tortoiseshell," Joplin, 1936, and Kansas City, 1937. Owner: Mrs. E. L. Jacobs.

white or other color, with eyes a deep orange or copper.

The Black and Blue, or Smoke Persian.—White towards the skin with blue grey or black at the tips with a silver frill and ear tufts, and eyes of orange.

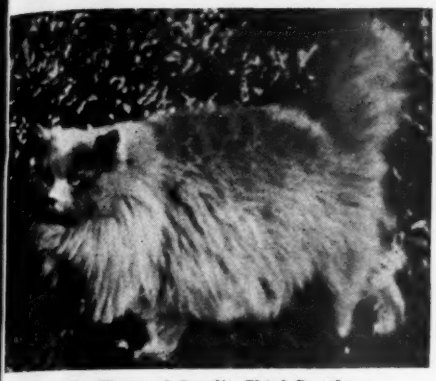
The Chinchilla Persian.—Silver hue at the roots and grey at the tips. No spots or shadings. A good chinchilla is a pale, unshaded silver with eyes a green or yellow.

White Persian.—Entire body a pure white with no colored hairs, and eyes a deep blue or orange.

The Cream Persian.—Light or dark cream with no smudginess of face or tendency to white, and eyes a deep amber or brown.

The Red or Orange Persian.—A rich brilliant red with no tabby markings, and eyes copper or orange.

The Tortoise-shell Persian.—Areas of black, orange and cream colors not brindled but in clear patches, eyes copper or orange —noses amusingly half black and half orange.



Ch. Charmed Land's Chief Seattle.

The Brown Tabby Persian.—A tawny background with broad black markings and bars like rings on the legs and chest, eyes a copper or orange.

The Red Tabby Persian.—Has a body of even groundwork with rich deep red markings, eyes copper or deep orange.

The name tabby is derived from a street, Atab, in Bagdad celebrated for the manufacture of its wavy, watered silks and from the similarity of the stripes to those of brindle cats the latter were called "tabby."

Not a good "Stop." Nose too long, ears large and pointed and head narrow. Not a good specimen.

The Silver Tabby Persian.—A silver white body with black tabby lines, eyes copper or orange. There are shaded silvers with dark areas on the spines shaded down the sides and face to pale silver. Eyes green. Masked silvers, and other color combinations such as the Blue Creams—two colors in patches, eyes copper colored.

The long-haired cats are desirable, pleasant pets. As a rule they are good mousers. They beautify home surroundings.

Sweating does not become visible in cats.

The cat breathes 20 to 30 times per minute.—*Udall.*

The cat reaches puberty at the age of 8 to 12 months.

The pulse in cats beats 110 to 130 times per minute.—*Udall.*

The length of the small intestine in the cat is about six feet; the capacity is four ounces (128cc).

The domestic cat is host to about as many species of flukes as of tapeworm and roundworm species combined.

"A cat can get its own living" is a remark constantly heard. Yes, in some instances true—but how?—*J. W. Hill.*

Cats continue reproductive for about ten years. The average life span of the cat is from 15 to 20 years.

The rectal temperature of cats ranges from 100.5°F. to 102.5°F. (38.1°C. to 39.2°C.). The average body temperature is 101.5°F. (38.6°C.).—*Hobday.*

Ingebrigsten examined 40 cats by interagglutinations. More or less strong agglutinations occurred in individual combinations, but a definite system of blood grouping could not be demonstrated.

The duration of estrum in the cat is one to three weeks; it occurs twice yearly as a rule if she is bred and suckles her young, but may recur in one to three weeks if the cat is not impregnated.—*Banham.*

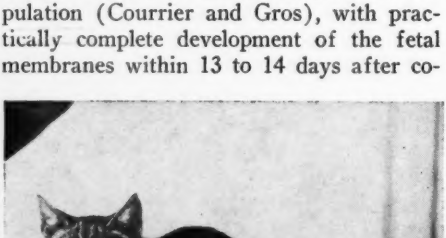
Reproduction and Growth in the Cat

By ROGER P. LINK, Manhattan, Kansas
Division of Veterinary Medicine
Kansas State College

THE LIMITED available statistics indicate that there are only minor variations in the reproductive cycles of the different breeds of cats. Environmental conditions, and especially the state of nutrition exerts some influence on these physiological functions, but the estrus cycles vary only in minor detail in most cats. The majority of female cats have three heat periods per year, commonly occurring in the months of February, June, and October. Occasionally one finds a female cat with a history of having never been bred showing four heat periods in one year. These are exceptions to the general rule and are probably due to some endocrine irregularity. Not infrequently one finds female cats raising three litters per year; their litters being as large as those cats which produce only one or two litters per year.

Gestation Period

Soame (1936), basing his opinion upon a large number of observations in England places the average gestation period in cats at 65¼ days. Courrier and Gros report the average gestation period for a large number of cats to be 64 days. These periods seem slightly longer than local observations would indicate. The average gestation period for cats in this section is approximately 60 days. Ovulation usually occurs between 24 and 28 hours after copulation (Courrier and Gros), with practically complete development of the fetal membranes within 13 to 14 days after copulation. Removal of the corpora lutea or spaying before the fetal membranes are developed, or any time up to the 45th day of pregnancy, results in abortion or resorption of the fetuses. If the corpora lutea are removed after the 49th day, pregnancy is not disturbed. When abortion occurs, the placentae frequently remain undisturbed until the end of the gestation period.



A patient in the Angel Memorial Animal Hospital

Litter Size

Among the factors determining the size of the litters is the weight of the queen. Hall and Pierce (3) found the mean litter size for 13 smaller cats to be 3.08 and for 10 larger cats five. However, the number of kittens per litter and the birth weights are not directly proportional.

Birth Weight

These weights were taken as soon as the kittens were found; some may have been born 10 hours when weighed. Kittens usually increase in weight from eight to ten grams in 24 hours, so there may be a slight error in these figures. The birth weight on 30 kittens varied from 73 to 160 grams; the one weighing 160 grams was the only kitten in the litter from a large cat. Few of the kittens weighed more than 120 grams; the majority ranging between 91 and 112 grams.

The birth weight seems to be influenced by two factors:

1. Influence of litter size. Since the total litter weight varies within narrow limits, the size of the fetuses must be influenced to some degree by the number of kittens in the litter. Latimer and Ibsen recognized two factors in this relationship: crowding of the uterus in large litters, and a limitation of the capacity of the maternal organism to supply adequate nutrition for optimal growth of a large number of fetuses. Immaturity and chronic malnutrition may decrease the number of ovulations, increase fetal mortality and result in smaller litters.

However, the birth weight in smaller cats seems to be greater than it is in larger cats.

2. Influence of weight of the dam. A proportional relationship between the weight of the dam and fetuses in guinea-pigs was reported by Latimer and Ibsen. Hammond reported the same relationship in rabbits. Although the smaller matrons show a tendency to have kittens with greater birth weights than the larger, the kittens per litter are fewer.

Lactation

Examination of a large number of nursing female cats revealed the average number of actively secreting mammary glands to be slightly more than nine. The smaller cats had an average of 7.06 mammary glands while the larger cats had an average of 10.4. Very few cats suckle their kittens more than 45 to 50 days.

Average composition of cat's milk:

Water	79.7%
Protein	7.4%
Fat	8.9%
Sugar	3.5%
Ash	0.52%
Total solids	20.+%

Growth to Weaning

During the first 45 days the growth curve is nearly a straight line. Occasionally a litter of kittens shows very little growth the first week of life. Kittens usually begin the ingestion of solid foods at from 25 to 30 days of age, but there is not a noticeable increase in growth rate until after the 45th day of life. There seems to be no detectable difference in the growth rate in the two sexes of kittens until they are about eight weeks of age. After that time the males show a growth weight approximately 10% greater than the females.

References: Nos. 46, 89, 108, 110, 111, 185, 204 and 259.

* * * *

Long-haired cats are quite apt to swallow considerable hair in the process of licking themselves, and are sometimes made dangerously ill by the accumulated mass. Owners of such animals should be advised to brush the animal's coat thoroughly every day to remove the loose hair, and to give them a dose of sweet oil twice a week to prevent hairballs forming.

Endometritis in the Cat

In the treatment of chronic endometritis of 18 cats, a single dose of 50 mouse units resulted in a pronounced increase in the discharge from the vulvar orifice, while the uterus began to contract. At the end of about 10 days all the symptoms of endometritis had disappeared, the cervix had closed, and the uterus had assumed normal proportions. In most cases the vulvar discharge had ceased; in the few cases where a slight vaginal catarrh remained, this latter condition quickly responded to intravaginal injections of an antiseptic solution, repeated three to four times [4].

* * * *

Hydrocephalus in Kittens

In an eight-week-old litter of six kittens, four of them showed loss of coordination. They were unable to control their movements and would fall down and roll over upon attempting to walk or run. The rolling was not confined to either side but depended upon the position in which they fell. The kittens were destroyed. Upon autopsy two were found to have hydrocephalus [5], and two cholesteomata.

* * * *

Ludwig's Angina in a Cat

The subject was a five-year-old, male cat [2]. The history disclosed that the animal had not eaten for two days, and that it salivated incessantly. The owner suspected rabies. The clinical examination revealed considerable swelling and infiltration in the region of the base of the oral cavity. There was a pronounced collateral edema. The patient was in very poor condition; the temperature was 40.2°C., the pulse 150 and irregular. The findings of the examination suggested the existence of a gaseous phlegmone. Median opening of the edema did not bring relief. The following day the cat died. Autopsy revealed necrotic caries of the base of the oral cavity, nephritis, and pneumonia.

[4] Lesbouyries, G., and Berthelon. 1937. Hormonotherapie sexuelle chez les carnivores domestiques. *Bull. de l'Acad. Vet. de France* 10:126-130.

[5] Milks, H. J. 1918. Hydrocephalus. Cornell Vet. 8:298.

[2] Collet, P. 1931. Phlegmone sus-hyoidien chez un chat (angine de Ludwig). *Rev. Vet.* 83:65-70.

Feeding the Cat

DIET plays an important part in the health and usefulness of the cat; therefore, care should be exercised in the selection of food for these pets. While a varied diet is essential, precaution must be taken not to overfeed, especially in hot weather, when less food is required. Ordinarily the total food intake per day should be about one-half ounce per pound of body weight. The cat should be fed regularly and sufficiently in order to avoid having it develop the scavenger habits of the alley cat or the primitive habits of the predator. Incidentally, it is claimed that the thin, half-starved, listless cat is not satisfactory for catching mice or rats.

Clean water should be accessible at all times. One may feed moderately twice a day. The cat, being a carnivore, should have meat in its diet. Milk, however, forms its principal food; it should be fresh, either from disease-free cows, or pasteurized. Sour milk is apt to cause digestive disturbances, although it may be indicated as a dietary measure. Bread, preferably stale bread, or crackers and other ordinary biscuits may be added to the milk. Some prefer to give bread dipped in milk and squeezed fairly dry before feeding. Gravy or soup, potatoes, vegetables, kitchen and table scraps, are economical foods. Most cats are fond of asparagus, celery and many other vegetables. Vegetables should, therefore, be included in the menu from time to time, not only to give variety, but for their mineral and vitamin content. It is often observed that cats will nibble grass. Cats eat dog biscuits readily. There are a number of proprietary cat foods on the market. The same discretion is needed in selecting and recommending them as for the proprietary dog foods.

Case No. 25935, of Notices of Judgment under the Food and Drugs Act involved shipments of dog and cat food (Old English Dog and Cat Food, Best Yet Canning Co., San Jose, Calif.) in which viscera lungs, segments of intestines, tissue from the trachea, lips and stomach, glandular tissue and predigested material from stomach of animals had been substituted for meat and glandular organs from beef and lamb, which the article purported to contain.

Case No. 26028, of Notices of Judgment under the Food and Drugs Act involved dog and cat food (Bar-None Brand Food for Dogs and Cats, Bar-None Sales Co., San Jose, Calif.) which were represented to contain substantial amounts of fresh, lean, solid red meat and choice cuts of meat. Examination showed that they consisted chiefly of barley and carrots and that they contained some crushed bone and other substances. They contained approximately 2% of meat products.

Case No. 26346, of Notices of Judgment under the Food and Drugs Act, the dog and cat food (Satin Quality Dog and Cat Food, Maryland Grocery Co., Baltimore) was represented to contain 9.55% of protein, 2.1% of fat and not more than 0.63% of crude fiber. Actual analysis of a sample revealed 6.5% protein, 1.35% fat and 1.76% crude fiber.

Case No. 26439, of Notices of Judgment under the Food and Drugs Act involved dog and cat food (Natural Brand Dog and Cat Food, Natural Food Product Co., New York City, Puro Pet Foods Co., New York City and Doyle Packing Co., Newark, N. J.) that was decomposed, consisting in whole or part of decayed animal and vegetable substances. In addition, part of the food samples were short in weight.

Case No. 27003, of Notices of Judgment under the Food and Drugs Act involved dog and cat food (Keeno Dog and Cat Food Kibble Biscuit, Keeno Packing Co., Southgate, Calif.) that contained less crude protein, less crude fat and more crude fiber than was declared upon the label, which bore false and fraudulent representations regarding the alleged effectiveness of the article to increase the vitality of dogs.

Fish is a favorite food and may be given as a change in diet. Care should be taken to see that the fish is free from parasites, unless it be well cooked. Fish-heads are welcome tid-bits for cats. Small, sharp fish or chicken bones should not be fed. Heavily salted food is to be avoided. It is needless to emphasize that the food or food scraps must be wholesome; otherwise digestive disturbances or skin eruptions, or both, result.

As a guide in balancing cat rations, the following may serve. Vitamin A promotes

tissue formation, growth and feeling of well-being, appetite and digestion, especially in young animals. Reliable sources of this food factor are: Whole milk, butter, cheese, egg yolk, cod liver oil, thin green leafy vegetables, yellow corn, yellow sweet potatoes, carrots, spinach, green beans, peas, bananas and fish oils.

Vitamin B increases appetite, promotes digestion, stimulates metabolic processes and, indirectly thereby, growth; protects the body from certain nervous disorders and increases quantity and improves quality of milk during lactation. Reliable sources of this food factor are: Whole grain cereals, peas and beans, raw fruits, buttermilk, corn, cabbage, spinach, egg yolk, honey and yeast. All cooked foods are deficient in this nerve-nourishing element.

Vitamin C is essential to health and integrity of endothelial tissues; cooperating with vitamin B in nutrition of the thyroid-adrenal system, and with vitamin D in the regulation of the calcium metabolism. Reliable sources of this factor are: Green peppers, oranges, lemons, tomatoes, bananas and other raw fruits, sprouted greens, green leafy vegetables, raw liver and raw cabbage. The dog is able to synthesize its own vitamin C but the cat seems to require it in the ration.

Vitamin D controls the calcium equilibrium and regulates the mineral metabolism. Reliable sources of this factor are: Cod liver oil and other fish oils, egg yolk, whole milk and spinach; exposure of skin to sunlight or to ultra-violet rays.

Vitamin E is necessary to reproduction in the male and the female. Reliable sources of this factor are: Whole grain cereals, wheat germ oil, milk, lettuce, water cress and raw fruits. Scientific proof that the dog does not get sufficient vitamin E in the ordinary ration is lacking, as is also proof that it does get this vitamin in adequate amounts.

Vitamin F includes certain essential fats.

Vitamin G (B_2) a part of the vitamin B complex, is necessary to growth and development. Reliable sources of this factor are: Cereal germs, brewers, yeast and eggs.

Diet of the Cat in Disease

Illness, usually, interferes with the digestive functions of the body in some way, even when its seat is entirely remote from the organs of digestion. Consequently, the diet of hospitalized cats needs careful attention. The food must be nourishing and in a form easily digested, such as warm milk, milk and egg, beef broth or other meat extracts. If the cat can swallow, moderate sized portions of solids, a little boiled or fried fish, boiled tripe, or raw beef, well minced, may be offered.

In case of a major operation, feed nothing but milk or broth for three to four days following the surgery. Feed sparingly for a week.

A cat refusing to eat beyond a reasonable period of time, may be tempted by giving her a freshly killed mouse or sparrow.

When the appetite is decreased through inability to smell, as in nasal catarrhs, Kirk recommends that an odorous food, such as a hare or well-hung pheasant, etc., be offered, which will awaken a greater interest in food.

In case of anorexia, in which the function of the bowels is not disturbed, rectal feeding may be resorted to.

Boiled liver is useful once a week, or when the cat is a little off feed, as it acts as a laxative; it is not, however, good diet for regular use. Cats are usually fond of fried bacon, also of the fat from it.

In cases of stomatitis, demulcent liquid foods, delicately boiled fish, minced and moistened, or beef extract, are indicated and may be tried.

In cases of diarrhea or simply looseness of the bowels, a little boiled rice is a good addition to the milk.

In infectious enteritis, brandy in milk with bismuth three times daily has been recommended. Glucose in normal saline solution given subcutaneously, is an aid in sustaining a near-moribund animal over a critical period.

References: Nos. 27, 150 and 204.

A Chronicle of Cat Epizootics

IN 1414, according to Saxo Grammaticus, a severe form of dysentery raged in Germany, affecting cats.

In 1514, Forster and Webster noted an epizootic among cats in England, but unfortunately they neither described the symptoms, nor gave their authorities.

In 1578, an epizootic disease ravaged cats in Paris, France.

In 1613, when plague raged in Constantinople, the cats were transported to Scutari, under a supposition that they were the cause of the plague, being themselves distempered.

In 1630, an epizootic occurred among cats at Padua, Italy.

From 1671 to 1672 an extensive exanthematous epizootic was observed among cats in Westphalia, Germany. The heads of the cats were covered with scabies, and at first the ears were inwardly crusted with scaly matter. The eyes seemed covered with a film, although the animals could see until suppuration took place; after this period they died. Sleep continually oppressed them. The skin disease did not proceed further than the head. There was scarcely a house in which some of the cats were not affected.

In 1679, cats died in large numbers in Vienna, Austria, during the plague.

In 1712, in the country about Kaskow, Hungary, an epizootic raged among cats during the spring, so deadly that in many villages not one of these creatures remained alive, and in consequence thereof the peasantry complained very much of the mischief done by the increasing swarms of mice.

In 1762, an epizootic of an eruptive nature showed itself among cats at Lyons, France.

From 1782 to 1784, Barrier reported an epizootic among cats to have occurred in the neighborhood of Chartres, France. The disease was thought to have been of the same nature as distemper in dogs. Many farmers, who had usually a score of cats on their farms, lost the whole of them by this disease during the winters of 1782, 1783, and 1784.

In 1789, a catarrh of epizootic proportions occurred in Philadelphia, Pa.

In the same year, during the plague at Cairo, Egypt, cats died there in large numbers.

In 1796, an epizootic existed among cats in Holland. The cats in the neighborhood of Harderwyck were attacked with a peculiar skin disease, which had the appearance of scabies. They had also an acrid, stinking discharge from the eyes, which at last blinded them.

Reporting in the same year, Doctor Darwin of Derby, England, writes: "The parotitis suppurans, or mumps with irritated fever, is at times epidemic among cats, and may be called parotitis felina. In the village of Haywood, in Staffordshire, I remember a whole breed of Persian cats was destroyed by this malady, along with almost all the cats of the neighborhood."

In 1797, an extraordinary epizootic among cats, remarkable not only for its prevalence in many countries, but also for the peculiarity of its origin and spread, appears to have been developed in America. This cat distemper appeared in Philadelphia as early as June and proceeded northward and eastward. In August it was very fatal in New York, and in the course of the summer and autumn, it spread destruction among these animals over the northern states. It was calculated that five thousand cats perished in Philadelphia, and four thousand in New York. In England a pestilence among cats swept away those animals in thousands. In London, the cat epizootic manifested itself during the months of March and April. It is said that in three parishes of London, within 14 days, more than five thousand cats died. In Ireland the cat plague was also observed: "The feline race in this country are dying in numbers by a mere murrain similar to that which sometimes seizes and spreads

among the black cattle; because some of the skins of the cats which died of the disorder now prevalent among them, being dried, and the hair being taken off by lime, appear full of small holes caused by numbers of worms or insects that thus penetrate. When seized with the distemper, the poor animals appear to be in the greatest agony."

From the beginning of September to the end of September, seven thousand cats died of this epizootic at Copenhagen, Denmark. In the next month, October, it was prevailing at Bordeaux, France, as mentioned in the Bordeaux newspapers. In Stockholm, Sweden, it was also observed in this year. In Lusatia, Germany, it was reported in the month of December.

In 1798, an epizootic among cats showed itself in Holland; it was briefly described by Schelver. In the same year an "eruption of itch" showed itself at Lyons, France, among the cats, and nearly destroyed them all. In Italy, the disease was observed by Buniva in Piedmont and by Brera in Lombardy.

At Vienna, Austria, according to Penada, the disease killed more than 25,000 cats; from this locality it spread by Carinthia and the Tyrol into Friuli, Venice, and Padua. It appears also to have extended to the Island of Zante, in the Mediterranean.

Heusinger is of the opinion that the dates of these various attacks may lead us to infer that the direction taken by this singular epizootic was from the northwest to the southeast.

In 1799, of 20 cats which were kept at the prison at Stapleton, near Bristol, England, eight perished from an epizootic. Two of these particularly were observed to have thrown up, by repeated and severe retchings, a yellow fetid matter. The bodies of these animals, as death began to approach, assumed more and more a yellowish tinge.

In 1800, Noah Webster, American lexicographer, mentioned a pestilence among cats which swept away these animals by the thousands.

In the autumn of this year, Cadiz and Seville, Spain, were ravaged by a pestilence; the cats suffered severely.

In 1803, Blaine asserted that the distemper in cats was general throughout Europe; nearly one-half of the cats died from it. It produced cough, sneezing, running from the nose and eyes, with great wasting and weakness, and sometimes purging. About January of this year, great numbers of cats in Shrewsbury, England, were seized with what was commonly called the "haust," which was characterized by swelled heads, defluxion from the nose and eyes, with vomiting, sometimes purging, sometimes costiveness. During the prevalence of the influenza at Droitwich, England, cats also were affected, and many died. A disease among cats was observed at Gosport, England, several months before the outbreak of influenza at that place.

In 1815, at Maubege, France, dysentery was panzootic; people, horses, dogs, and cats being affected.

In 1821, towards the end of the year, an epizootic, contagious in its nature, appeared among cats in Cleve. It spread rapidly, and was very fatal in a short time. It began with loss of appetite, the cats looked as if they were suffering from cold, and showed a great desire to indulge in the warmth of the sun or of stoves. There was muscular debility, quickly supervened by intense thirst, staring coat, watery eyes, and bilious vomiting. All the animals attacked by this disease died in from 24 to 48 hours. There was no doubt as to the contagious character of the malady for if the healthiest cats came near the diseased, or if they even went to the places where the diseased or dead had been, they soon showed symptoms of the disease.

In 1823, accounts from Norway, Denmark, and Russia, as well as those published in England, proved that rabies was very frequent among cats.

In 1824, rabies was widely prevalent among cats in Sweden.

In 1831, in Bohemia, Austria, the number of cats that perished was most striking The animals were seized with dullness, loss of appetite, great thirst, violent vomiting,

and a slimy, watery diarrhea. They usually died in convulsions.

In lower Austria cats died as numerously as elsewhere, and from apparently the same disease.

In 1832, an epizootic among cats occurred at Aleppo, Syria, reducing their numbers by more than one-half.

In 1883, cats kept at a farm in the village of Nesselhausen, Baden, died from diphtheria. The disease was said to have been introduced by fowls brought from Verona, Italy.

In 1886, a diphtheria-like disease was noticed among cats at Aldershot, Farnham, Yately, and Petersfield, England.

References: Nos. 76 and 239.

Allergic Reaction to Cat Hair

Cat hair is a common cause of asthmatic attacks in certain persons, sensitized to cat hair. A positive reaction to the cat hair test usually means that the patient is clinically hypersensitive to this type of irritant. Hypersensitiveness to cat hair varies from a mild rhinitis with or without an occasional cough to a most persistent and disabling rhinitis and bronchial asthma, with or without an associated conjunctivitis. Cat hair is frequently encountered where there is no direct exposure to cats.

Coca, in his book, "Asthma and Hayfever," writes as follows: Pelts of the domestic cat are gradually assuming importance as furs. The skins are dressed, dyed to imitate other furs, and sold under names suggestive of more costly skins, to be used for those purposes, for which genuine furs are employed. Cat skins are commonly used for making carriage robes and for lining caps, coats, gloves, slippers, etc. Cat hair is employed as a covering for toy animals, and as an adulterant of other hair, for stuffing bedding and furniture, etc.

There is considerable controversy among allergists as to the necessity or advisability of desensitization. Elimination of cats and products made from cat hair is usually sufficient. However, if exposure is unavoidable, and if contact with cats brings on attacks of asthma, desensitization is definitely indicated.

References: *Jour. Amer. Med. Assoc.* 100:1451, and 102:1421.

Kittens should be weaned at five to seven weeks of age.

In preparation for the act of parturition the female cat prepares a bed in a secluded spot. Parturition lasts from three to six hours.

In cryptorchid and monorchid cats both testicles or the second testicle descends into the inguinal region in April.—*K. W. Shedlock.*

Cats litter about three to six kittens, rarely more. Of 13 litters recorded by Albrecht, the average was slightly less than three kittens.

The tom cat differs from all other male domestic animals in the direction of the penis, which forces him to copulate vertically from above, while the cat prostrates herself, bending in a manner that the vulva is turned upward. The tom cat steps over her with all four paws, clutches her with his claws, and consumes some time in the act of mating, which by reason of the small spines of the penis cannot be entirely painless for the female.

When there is a history of a choking cough, gagging, usually complete abstinence from food (though not always so), be sure to look into the pharynx, even if ether has to be given to do so, for you will often find a needle there, or in that region.—*G. B. Schnelle.*

The cat when sick has the characteristic common to all felines of invariably retiring to some secluded place and hiding. This tendency, coupled with neglect of the toilet is of great value in arriving at a conclusion as to whether or not the animal is ill. —*C. G. Saunders.*

The Cat As a Carrier of Disease

IN THE field of public health the veterinarian is an important factor in the prevention of the spread of diseases from animals to man. For his own protection as well as for the protection of his client, and his client's live stock, the veterinarian, called to treat cats, must be acquainted with the rôle that the cat is capable of playing as a carrier of diseases transmissible to man or to other animals.

Though cats have a number of diseases peculiar to their species, they nevertheless are susceptible to certain diseases of other mammals. Moreover, the scavenger propensities of the ill-housed and the ill-fed cat make this animal a distinct menace not only to the human beings with whom it comes into intimate contact, but also to other animals, especially on the farm, though the contact may be merely indirect or mechanical.

Tuberculosis

Cats are susceptible to both the bovine and the human types of *Mycobacterium tuberculosis*. They occasionally become infected from meat or milk of tuberculous animals. Cernaianu, fed twice daily, during an entire month, 4 to 5cc of tuberculous human sputum in milk to four cats, aged respectively two, three and four months and two years. All the cats died after three to four months, showing emaciation. Postmortem examination revealed extensive tubercular lesions either in the intestines or in the intestinal lymph nodes. Inoculation of tissue from the tubercular lungs into two guinea pigs caused the death of the latter. Gray encountered two cases of tuberculous pleurisy in cats in the house where a phthisical young man resided.

Brucellosis

Cats gave positive agglutination tests for undulant fever in the Island of Malta. Bruce isolated *Brucella melitensis* from the mesenteric lymph glands of five such infected animals.

Glanders

Glanders and melioidosis are transmissible to cats. In the post-mortem house of a veterinary college in which Huidekoper had just made an autopsy upon a glandered horse, he noticed a cat with a litter of kittens, eating at some of the organs which he had placed to one side for demonstration. He had the cats immediately locked up. In four days all of them were infected with the disease and had to be destroyed.

Anthrax—Fowl Cholera—Hog Cholera

Cats have contracted anthrax from eating portions of the carcasses of animals dead of that disease. There are also observations to indicate that fowl cholera has been spread from farm to farm by cats dragging around the viscera of chickens that had died from the disease. Other diseases, like hog cholera, swine erysipelas, etc., may well have been spread in a similar manner.

Influenza-Like Disease

Bacillus bronchisepticus, a reputed source of respiratory catarrh in cats is said to be a frequent cause of catarrh in children.

It is generally accepted that there exists no relationship between cat diphtheria and human diphtheria; but cats may serve as the carriers of the Klebs-Loeffler bacillus in the nose or throat without suffering from the human type of the disease. Simmons reported a fatal case of diphtheria in a woman. Apparently she had contracted it from a cat which was permitted to sleep in her bed. Cultures from the throat of the woman and of the cat demonstrated the presence of the Klebs-Loeffler bacillus. The identity of the organisms in both instances was definitely established through immunologic tests carried out with guinea pigs protected with diphtheria antitoxin. A second cat which had been associated with the animal just referred to, was found to harbor true diphtheria bacilli in lesions of the vocal cord.

Tularemia—Plague

Green and Wade state that of a group of eleven cases of tularemia in Minnesota, one appeared to be directly due to a cat,

while the others resulted from human contact with rabbits, dragged home by cats.

Hull maintains that cats are relatively immune to rodent diseases. He says that they show slight susceptibility to plague and tularemia, but are relatively unimportant in the spread of each disease.

De Raadt stated that during a recent epidemic of plague in Java many cats died. In order to test the susceptibility of cats to plague he fed plague-infected rats to two house cats. Both cats died from the plague. Another cat which had survived the epidemic at the island, proved to be immune to plague infection.

Typhus

Lepine and Lorando recorded a case of human typhus in which the owner's cat was suspected of providing the source of the virus. The brain of the animal, inoculated into guinea pigs, caused a typhus reaction and the appearance of rickettsia. Fleas from the cat were also shown to harbor the typhus virus. The authors concluded that the cat does not contract typhus readily nor retain the infection for a prolonged period, but that it may become infected by the bites of rat lice, or by eating infected rats, and it must be considered as a potential source of the human disease.

Spotted Fever—Endemic Typhus

Sikora found rickettsia in the spleen and blood of three cats which had died from a distemper-like disease. He considered these organisms the cause of the disease. Brigham inoculated a kitten with the virus of endemic typhus fever and recorded the temperatures daily. On the third day after inoculation there developed a febrile reaction which continued for four days. The cat showed signs of illness with loss of appetite on the 10th, 11th, and 12th days. The virus was recovered from heart blood obtained on the seventh day, and from the brain removed on the 14th day after inoculation.

Foot-and-Mouth Disease

The cat is not only susceptible to foot-and-mouth disease, but also capable of spreading it. Francke and Goerttler mention the following incidents.

On a certain farm where foot-and-mouth disease was diagnosed, the cats had been quarantined. After the release of the quarantine, the cats were allowed in the stable again and given fresh milk to drink. A few day later the cats displayed symptoms of foot-and-mouth disease.

On two other farms, cats were found exhibiting pronounced salivation and frequent movements of the lower jaw. On opening the mouth, the small yellow vesicles were visible upon the mucosa. A few days later, the cattle on each of the two farms succumbed to foot-and-mouth disease.

A farmer threw a piglet that had died from foot-and-mouth disease into the farm yard where it became covered by a heavy snowfall. Several weeks later, (meanwhile, the foot-and-mouth disease had become extinct on the farm), a thaw set in, uncovering the pig carcass. A cat, feeding on it, dragged the head of the piglet to a neighboring farm. The milker on that place noticed the skull and handled it. A few days later an outbreak of foot-and-mouth disease occurred among the cattle of the latter farm.

Rabies

From contact with rabid animals, especially dogs, cats may become infected with rabies. As a source of rabies transmission to man the cat is second only to the dog in importance. According to statistics of Pasteur, of 12,000 persons bitten by rabid animals, 11,000 were bitten by dogs, and over 700 (5.8%) were bitten by cats. Remlinger and Baily state that the number of persons receiving anti-rabic treatment as a result of bites from cats in North Africa varies from 5% to 12% of the whole number treated. In a recent outbreak of rabies in Anatolia, the majority of animal bites originated from pet cats. In a former outbreak in the same country the majority of persons were bitten by stray cats.

Pseudorabies

Infectious bulbar paralysis (pseudorabies) occurs also in cats.

Nicolic brings circumstantial evidence to prove that this disease is transmissible to man. The avenue of infection for man is

not known definitely, but it is believed that it is *via* the alimentary route.

Parrot Disease

Certain authors claim that the cat is susceptible to psittacosis.

Favus—Ringworm—Barbers' Itch

The cat is a common source of favus and ringworm infection in man. These diseases, in turn, it usually acquires from infected mice.

Dodge states that *Achorion schoenleini* is inoculable into the cat, but that it rarely occurs spontaneously in these animals. Holmes, too, says that in favus of cats the spread to man is the exception rather than the rule.

Microsporosis (ringworm) is a condition not easily diagnosed clinically in the cat, except by the fluorescence test, that is by exposing hairs on the affected skin to ultra-violet rays passing through a Wood's filter. The fur of the cat often remains in good appearance, and there is no great irritation beyond that causing constant licking. Miss Lock considers damp lick marks on the coat of the cat ample grounds for suspecting the presence of ringworm.

Fox and Blaxall are said to have first reported the transmission of ringworm from cat to man. Mewborn recorded the transmission of *Microsporon felineum* from a kitten to a girl. Roberts isolated a similar organism from a kitten that apparently had spread the disease to several adults, six children, a dog, and another kitten.

Walpole, on careful examination of a blue Persian kitten, aged three to four months, found two small lesions, a little larger than the head of a pin, in the region of the shoulder and the tail. Microscopical and cultural examination definitely established that the kitten was infected with microsporosis. Several members of the household of the owner of the kitten also suffered from a skin affection which was diagnosed as ringworm by a medical specialist.

Livesey developed tinea circinata on the left wrist three weeks after examining a young cat that failed to reveal any sign of disease. Other lesions developed on subsequent days, but quickly responded to treatment. At the same time Mrs. Livesey who had handled the cat, developed lesions which were quickly cured. It was then brought to light that five persons in the home of the cat had been affected with ringworm. The cat had been given away in the meantime, and in its new home six more people had become affected with tinea.

Smith had occasion to observe a case of ringworm in a family where a white Persian kitten had just been purchased from a cattery. The kitten appeared normal and healthy. However, a close examination disclosed a skin lesion on the nose and one or two pale-red spots on the ears. In about ten days the child showed unmistakable lesions of tinea circinata on the breast and arms. The infection was rather virulent, and accompanied by an extreme itching and burning sensation. After the expiration of about two weeks Smith himself felt an itching pain on the back of his hand. A red circle appeared, about one-quarter inch in diameter, and spread rapidly to thrice its original size.

Davidson and Gregory recorded a very interesting case where a boy suffering from ringworm of the scalp, contracted from an infected kitten, in turn transmitted the infection to a healthy kitten. Holmes states that in practically all cases of ringworm infection in the cat there is a history of the contagion in man, in whom it is apt to be troublesome.

Milian and Karatchentzeff related that a three-month-old cat affected with trichophytosis was responsible for transmitting the disease to three persons within a period of 10 days, the time between contact and infection in each case being five days. Mycelian filaments were readily demonstrated in squamae from the human lesions and in the hairs of the cat. The parasite, found to be *Microsporon felineum*, developed rapidly on glucose agar, and was evidently of exceptional virulence.

Young observed that cats are carriers of ringworm infection, even though no

lesions are visible by ordinary light, and the animal shows no disease of the skin. He saw a considerable number of cases of transmission to persons from this animal. The lesions on the human body give a fluorescence comparable to that on the cat.

Dodge mentioned that *Favortrichophyton spadix* from tinea tonsurans of a child, and *Favortrichophyton fuligineum* from tinea tonsurans of man, proved inoculable into the cat.

Streptothricosis

Edington observed a sinus on the right side of the neck of a male eleven-year-old cat. The sinus discharged pus, containing very obvious granules. These granules were found to consist of numerous streptothrical filaments which showed true branching, but no conidia. Club formation was present. The filaments were about 0.5 microns thick. On culture a growth was obtained conforming to the described characteristics of *Streptothrix actinomyces.* Edington concludes that from the history of this case it would appear feasible that the infection had been derived from the teeth of another cat.

Poenaru cultivated *Streptothrix nocardia* from abscesses and ulcers of a cat.

Amebiasis

Deschien has shown that *Entamoeba dysenteriae* is pathogenic for cats. Cats infested with *Endomeba histolytica* frequently pass per anum a whitish fluid containing enormous numbers of amebae.

Hull states that the intestinal flagellate *Giardia,* found in rats and mice, is a variety of the species occurring in man. Cats have been found responsible in disseminating the infection.

Coccidiosis

Isospora bigemina, occurring in the cat, is also observed in man. Children playing with cats, carriers of this variety of coccidium, may infect themselves from this source.

Leishmaniasis

The cat is susceptible to *Leishmania donovani.* Leishmania in man are believed to be transmitted by fleas which have bitten cats.

Spirochetosis

Yamada and others have isolated an organism, indistinguishable from *Spirocheta morsus muris,* from cats. Beaumont and Gill mentioned that a child bitten by a stray cat, presented a syndrome characterized by successive febrile reactions, lasting six weeks, muscular swelling, and conjunctivitis. The case was regarded as one of "cat-bite fever," believed to be identical with "rat-bite fever" although the spirillum was not recovered from blood samples injected into guinea pigs and mice.

Wenyon states that a fever of the relapsing type, similar to rat-bite fever, following the scratch or bite of a cat, has been described in man.

Cole stated that a human subject was bitten and scratched while playing with a kitten. During the subsequent attack of fever the right supratrochlear gland was removed and part of it was ground up and inoculated into a guinea pig. Thirty-one days after inoculation the experimental animal exhibited dullness and conjunctivitis. Blood films contained a minute spirillum which was subsequently identified as *Spirillum minus.*

Mooser has seen a case of sodoku resulting from the bite of a cat, and has shown that cats (and dogs) can be infected with the organism found in rats.

Chagas' Disease

Maza found *Trypanosoma cruzi,* the cause of Chagas' disease in man, in the circulation blood of cats. Blood-sucking arthropods are necessary for transmission.

Distomiasis

Cats are hosts to several animal parasites, some of which are transferable to man either directly or indirectly. The liver fluke, *Opisthorchis felineus,* is common among cats and humans in Asia and Europe. *Amphimerus pseudofelineus,* a closely related species, is found in central parts of the United States. The infection in man, of course, is acquired from the ingestion of insufficiently cooked fish, containing the intermediary stage of the fluke. In some individuals who were in the habit of eating raw fish, more than one thousand

fluke specimens were counted in the gall ducts.

Tapeworm Infestation

The cat, being intermediate and final host to the tapeworm *Echinococcus granulosus,* acts as a reservoir of this harmful parasite of man.

The cat harbors also *Dibothriocephalus latus,* the fish tapeworm, and *Dipylidium caninum,* the dog tapeworm; infection of the latter is acquired by the ingestion of the fleas and lice, harboring the intermediate stage of the parasite.

Trichinosis

The swine nematode, *Trichinella spiralis,* is acquired by the cat from the eating of trichina-infected mice and rats, and from trichinous raw pork. C. O. Jensen stated that in Copenhagen in 1906 five out of 100 cats were trichinous; in 1912 two out of 100; and in 1918 one in 251 cats.

Hookworm Disease

Ancylostoma braziliense occurs in cats in tropical and subtropical countries. The larva of this hookworm is the cause of creeping eruption in man, common in the southern part of the United States.

Scabies

Livesey described discrete papules developing in the legs of a man, causing intense itching, and rapidly becoming vesicular. The vesicles were about the size of the head of a small pin, and contained a very small quantity of slightly turbid fluid. The itching did not cease when the vesicles ruptured. The lesions were not symmetrical, and were scattered about the legs and thighs, the front of the thighs being particularly affected. No lines or subepidermal galleries could be seen, and no parasite was found for identification. The disease spread to the trunk, chest, and shoulders, with one or two papules on the flexor surface of the arms. The diagnosis "scabies" was made from the appearance and course of the lesions, and from the fact that there was an old cat in the house with typical scabies on the head and back of the neck, and from which the parasite was identified. The disease had evidently been transmitted by the cat rubbing against its owner's legs.

Philadelphi observed typical efflorescences on the trunk of the body of a 29-year-old woman. These efflorescences occurred from the chest to the upper third of the thighs; they were especially numerous around the naval and below the shoulder blades. The disease had existed for a year, during which time the patient had been in contact with five mangy cats.

A twenty-year-old working man, in contact with six mangy cats which alternately slept in bed with him, exhibited dense spread of efflorescences on the trunk and the flexor sites of the extremeties. Itching existed for several days.

Pentastomiasis

Newman observed *Linguatula denticulata* in the abdominal and thoracic cavity of cats.

Discussion

The list of diseases and parasites, for which the cat is a potential source of transmission to man or to other animals, is thus an imposing and formidable one. Proper care and management of the house cat, and proper personal hygiene when in contact with cats will reduce the danger to human health considerably. With regard to the alley cat, caution in its handling is always a wise policy. The painless destruction of all stray and homeless cats loitering in a community should be demanded not only as a public health measure in every city, but as a humane act.

As Kirk has pointed out, the cat is not naturally a dirty or untidy animal. When ill it usually gives adequate and continuous warning that all is not well. If these warnings are heeded by the cat-owning public, proper steps can be taken for the safeguarding of the health of the members of the family that have been in contact with a diseased cat, and for the public at large.

References: Nos. 23, 93, 145, 149, 152, 161, 235, 276, 286 and 309.

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Cats which are entirely white and have blue eyes are generally deaf.—*Darwin* "The Origin of Species."

The Digestive System of the Cat

By MAX McLEOD, Manhattan, Kansas
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IT is not the purpose of this article to attempt a complete description but rather to review the more important and interesting features of the digestive system. Since all are familiar with mammalian anatomy, the classification of the various organs and many of the details can be omitted. Reference to the illustrations will aid in following the description.

The Mouth

The mouth is relatively long and narrow (fig. 1). The short face is misleading for the mouth extends considerably beyond the hard palate. The lips are long, the angle is situated opposite the third maxillary premolar, an arrangement which exposes, with a little retraction, almost the entire dental arcade. The upper lip is thick, muscular, and divided by a median fissure. The lower lip is thinner and undivided. Its free edge lies medial to the upper canine tooth and adjacent part of the upper lip when the lips are closed. A number of papillae are present on the mucous lining adjacent to the upper canine tooth.

The cheeks are small due to the extensive lips and the manner of dividing the food. An extensive buccal cavity is not necessary when the food is not thoroughly masticated. The parotid duct pierces the cheek opposite the third maxillary premolar.

The palate has hard and soft parts of approximately equal length. The mucosa of the hard palate presents seven curved ridges, concave posteriorly. Each ridge is made up of three rows of hard papillae. The soft palate passes posteriorly from the hard palate to the epiglottis; its free edge is usually above the latter organ. The anterior pillar, to the base of the tongue, is thick, while the posterior pillar is little more than a fold of mucous membrane crossing the lateral wall of the pharynx. It disappears near the entrance of the esophagus.

The tonsils are a pair of pedunculated ovoid masses of lymphoid tissue situated in the angle of divergence of the pillars of the soft palate. Their location is in the dorsolateral part of the isthmus faucium rather than in the pharnyx. Each occupies an oval fossa that conceals most of the structure.

The tongue is about 2½ inches long and freely movable. The free end is rounded and thin. The dorsal surface is covered with papillae. The most numerous and interesting are the filiform papillae. These are long, curve backward and are horny. They are of sufficient size to be readily visible and are responsible for the rough appearance and feel of the tongue. The circumvallate papillae form two rows, of two or three papillae each, on the base of the tongue. The fungiform variety are scattered over the dorsum with the filiform. The foliate papillae are located along the posterior part of the lateral border of the tongue.

The cat, like all mammals, has a temporary and a permanent dentition—a fact which many laymen do not realize. The dental formula for the adult is 2(I 3/3, C 1/1, PM 3/2, M 1/1)=30. The incisors are small and of unequal size, the smallest being the central pair. They serve in stripping the flesh from bones but do little cutting or dividing as their name implies. The canine teeth are well developed. They curve slightly backward and are deeply implanted in the jaws. The upper ones are slightly the larger. The premolars are not grinders but shear teeth. They have sharp irregular crowns and those of the mandible pass medial to those of the upper jaw when the mouth is closed. The first maxillary premolar is small and single rooted. The second is larger and has two roots. The third premolar is the largest tooth of the entire dentition. It has three roots; anterior, posterior and medial. The anterior and medial roots almost puncture the floor of the maxillary sinus. The single upper molar is small, single rooted and located posteromedial

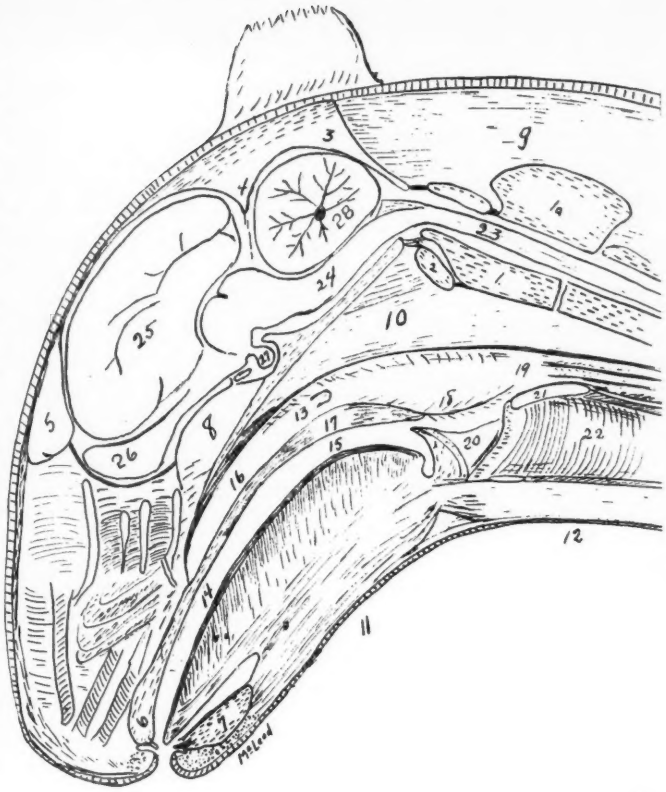

Fig. 1. Median Section of the Head and Adjacent Parts of the Neck. 1, Body of the axis; 1a, spine of the axis; 2, atlas (ventral arch); 3, occipital bone; 4, tentorium osseum; 5, frontal sinus; 6, premaxilla; 7, mandible; 8, sphenoidal sinus; 9, dorsal muscles of the neck; 10, ventral straight muscles of the head; 11, ventral muscles of the tongue and of the hyoid bone; 12, ventral muscles of the neck; 13, pharyngeal orifice of the Eustachian tube; 14, cavum oris; 15, isthmus faucium; 16, nasopharynx; 17, soft palate; 18, lateral wall of the pharynx (the posterior pillar of the soft palate is just below 18); 19, entrance to the esophagus; 20, lateral wall of the larynx (the epiglottis is anterior to 20 and the true vocal cord posterior); 21, Lamina of the cricoid cartilage; 22, lateral wall of the trachea; 23, spinal cord; 24, medulla; 25, cerebrum; 26, olfactory lobe; 27, hypophysis cerebri, and 28, cerebellum.

to the third premolar. The two mandibular premolar teeth resemble, except that they are smaller, the second and third maxillary premolars. Each has two roots. The mandibular molar resembles the premolars in shape and size. The shape of the articular surfaces of the temporomandibular joint allow but a very limited amount of lateral motion.

The salivary glandular tissue is abundant. Five pairs of glands are named in addition to the scattered and unnamed masses opening into various parts of the mouth. The triangular parotid gland is located on the base of the external ear. It is not nearly as large as a superficial examination leads one to think since it is molded on the convex conchal cartilage. The parotid duct leaves the anteroventral angle of the gland, crosses the masseter muscle, partially embedded in its superficial surface, and pierces the cheek opposite the third maxillary premolar. The mandibular salivary gland occupies the space formed by the angle of the mandible and the neck. It is smooth, solid and thick, being easily the largest of the salivary glands. Lobulation, very evident in the parotid gland, is so slight that this gland resembles the mandibular lymph glands situated at its anterior border. The mandibular duct leaves the anterior angle of the gland, passes under the mylohyoideus muscle, forward with the duct of the sublingual gland along the ventro-lateral surfaces of the tongue to open on a papillae on the floor of the mouth opposite the canine tooth. The sublingual gland is located between the side of the tongue and the ramus of the mandible. Its duct opens with that of the mandibular gland. The zygomatic or infraorbital gland is found in

the anterior and ventral part of the orbital fossa medial to the zygomatic process of the malar bone. Its duct enters the roof of the mouth posterior to the molar tooth. The buccal (molar) gland is situated on the ventral part of the buccinator muscle and ramus of the mandible similar to the ventral buccal salivary tissue of the ox. Its secretion is carried to the cavity of the mouth by several short ducts which pierce the cheek.

Pharynx and Esophagus

That part of the pharynx common to the respiratory and digestive systems is short and wide. The anterodorsal part, nasopharynx, serving the respiratory system only, is long and narrow, (fig. 1). The pharyngeal orifice of the Eustachian tube enters the posterior part of the respiratory portion. The position of the other openings is similar to that of other mammals.

The esophagus is comparatively large; similar to that of the dog. From the middle of the neck to the fifth or sixth thoracic vertebra it lies to the left of the median plane. The mucosa is very light in color and arranged in longitudinal folds. The musculature appears to be striated.

Abdominal Cavity

The abdominal cavity is long and has a small diameter. It is relatively small when compared to that of omnivora and herbivora. When opened from the ventral side the most extensive structure visible is the great omentum. This extends backward from the greater curvature of the stomach a variable distance. In animals in good condition it contains considerable fat. The left limb of the pancreas is located in that portion of the omentum which passes dorsally on the visceral surface of the stomach.

The Stomach

The stomach is a sharply bent, U-shaped dilation of the alimentary canal situated behind the liver and diaphragm mostly to the left of the median plane. The left limb of the "U" is much larger and longer than the right. Its capacity is from four to six ounces. The parietal surface has an extensive contact with the diaphragm and a much smaller contact with the liver. When viewed from the left, (fig. 2), we see the left extremity between the spleen and diaphragm at the very dorsal part of the cavity. The lowest part of the greater curvature lies on the abdominal floor posterior to the xiphoid cartilage. The visceral surface is related to the great omentum, left limb of the pancreas, transverse colon, small intestine and the spleen. The esophagus enters about an inch below the left extremity at the junction of the greater and lesser curvatures. There is no external evidence of a sphincter cardia. The right or pyloric extremity lies against the visceral surface of the liver. There is a distinct constriction at the pyloris. Several lymph nodes are situated in the lesser curvature.

The Intestine

The small intestine occupies the space between the stomach and pelvic inlet. It has an extensive contact with the abdominal wall on the left while the cecum, right colon, and liver reduce the contact area on the right side. Ventrally the great omentum and bladder largely prevent direct contact with the abdominal floor. It is customary to divide the small intestine into duodenum, jejunum and ileum but no definite lines of demarcation exist. The length is about five times that of the body—approximately five feet in a cat of medium size. The diameter is about a half-inch.

The duodenum has the form of a long loop, the limbs of which are almost parallel. Thus the origin and termination are close together. It is located in the dorsal part of the cavity to the right of the median plane extending backward from the pylorus toward the pelvic inlet, (fig. 3). The right limb of the pancreas is located between the two parts of the loop. The pancreatic and common bile ducts enter the duodenum near the pylorus. The mucosa is much thicker than in other parts of the intestine. A diverticulum is present into which the ducts open. The anterior part of the loop is supported by the mesoduodenum while the posterior half is free.

The jejuno-ileum or mesenteric part of the small intestine is arranged in coils in

Fig. 2. Left Side of Abdomen

The ribs (9 to 12), the abdominal wall, part of the diaphragm and lateral pelvis removed. 1, Stomach; 2, left lobe of liver; 3, diaphragm; 4, kidney; 5, left colon; 6, spleen (probably larger than usual); 7, omentum, turned downward; 8, small intestine; 9, bladder; 10, urethra; 11, rectum; 12, anal sac; 13, testicle; 14, spermatic cord; 15, symphysis pelvis; 16, prepuce; 17, penis; 18, wing of ilium; 19, eighth rib, and 20, thirteenth rib.

the ventral part of the abdominal cavity between the visceral surface of the stomach and the pelvic inlet. The left part of the colon separates it from the roof of the cavity. The ileum projects into the cavity of the cecum and is provided with a well-defined sphincter. Here the mucosa is thrown into folds.

The great mesentery attaches the small intestine, cecum and right colon to the sublumbar region just anterior to the kidneys. Near the root of the mesentery is the large mesenteric lymph gland and between it and the intestine are several smaller glands. The mesenteric gland, apparently receives lymph from the small intestine, cecum and right colon.

The large colon has a length of a little more than a foot and a diameter of an inch or more. It is arranged in an unsymmetrical "U," the right limb being much the shorter, in the dorsal part of the abdominal cavity. It has neither bands nor sacculations. The cecum is a short sharply curved, blunt, conical structure with its blind extremity directed anteriorly. The ileum enters on the concave curvature. A large Peyer's patch is found in the apex. The ileocecal orifice is small, contracted and projects into the cavity of the cecum while no natural line of demarcation separates it from the colon.

The colon may be divided into right, transverse and left parts according to its location and direction. The terms ascending and descending colon, as used in man, are not applicable to the quadruped and should be discarded. The right colon, (fig. 3), begins at the cecum in the right flank, passes forward to the liver where it turns to the left, becoming the transverse colon. The transverse colon crosses the cavity from right to left behind the stomach. It turns posteriorly ventral to the left kidney and is continued as the left colon. The left colon, (fig. 2), passes posteriorly in the dorsal part of the cavity above the small intestine to the pelvic inlet where it joins the rectum without change in diameter or physical appearance. The colic mesentery attaches the transverse and left colon to the sublumbar region. It is continuous with the great mesentery and mesorectum and contains a number of colic lymph nodes.

The rectum is that part of the large intestine within the pelvic cavity. The terminal inch is constricted but the remainder has a diameter equal to that of the colon. The peritoneal covering is limited to a narrow band at the pelvic inlet. The mesorectum is short.

The anus, the terminal valve of the alimentary canal, is flat and does not protrude above the level of the perineum. It is provided with the usual internal and external sphincter muscles. When closed, the posterior half of its length is lined by skin. The anal sacs are a pair of large, thick-

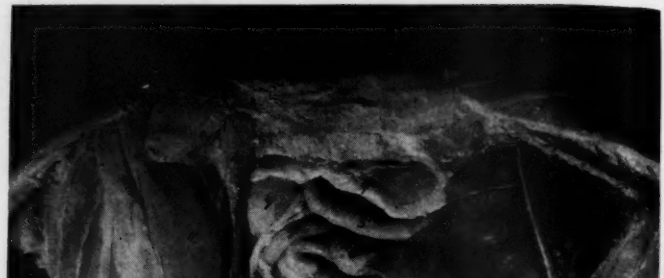

Fig. 3. Right Side of Abdomen

The abdominal wall, ribs (8 to 12) and part of the diaphragm removed. 1, Caudate lobe of liver; 2, right lobe of liver; 3, kidney; 4, fat; 5, duodenum; 6, right colon (the cecum curves medially from 6; 7, small intestine; 8, omentum turned downward; 9, bladder; 10, sartorius muscle (tensor fascia lata muscle removed); 11, quadriceps femoris muscle; 12, free end of gall bladder; 13, edge of diaphragm; 14, seventh rib, and 15, thirteenth rib.

walled, oval sacs located lateral and ventral to the bowel. The right and left sacs are in contact ventral to the rectum but do not reach its dorsal surface. They appear to be covered by a layer of striated muscle which encircles the sacs and rectum at this point. Their ducts open on the skin of the anus on the ventral part of the lateral wall.

The Liver

The liver is large—a characteristic of animals with a high protein intake. It is located posterior to the diaphragm; the larger part being to the right of the median plane. The left border does not reach the costal arch while the right border extends beyond the arch. Dorsally it is in contact with the right kidney. The parietal surface is convex and the visceral surface deeply concave. Five lobes are recognized —right, right central, left, left central and caudate. The right lobe is by far the largest. The two central lobes are probably equivalent to the middle lobe of the horse. The fissure separating them is, then, the umbilical fissure and contains the round and falciform ligaments of the liver. The posterior vena cava passes through the dorsal part of the organ, about two inches of its length being completely surrounded by glandular tissue. The gall bladder is located in a deep fossa between the right and right central lobes. When filled with bile it may come in contact with the diaphragm near the sternal end of the 8th rib. The common bile duct enters the first part of the duodenum with the pancreatic duct.

The Pancreas

The pancreas has two limbs which meet at a right angle on the visceral surface of the stomach. The right limb is located within the duodenal loop and the left limb in the deep layer of the great omentum on the visceral surface of the stomach. The duct is formed by a radicle from each limb and enters the duodenum with the common bile duct.

The Spleen

The spleen, while not a part of the digestive system, is too large an organ to be omitted from the discussion. It is a long narrow structure extending from the left kidney almost to the abdominal floor. It is in contact, but easily separated from, the visceral surface of the stomach near the left part of the greater curvature. It is attached to the stomach by the great omentum (gastro-splenic ligament) and to the anterior part of the left kidney by the suspensory ligament. The ventral part of the organ may vary in width; in one cat, not bled before embalming, it was three times as wide as the dorsal part.

Female Reproductive Organs of the Cat

THE ovary is relatively small, barely 1cm long, almost cylindrical, but somewhat flat. The serosa is attached to the entire length of the margo mesovaricus of the ovary, while the ligamentum ovarii proprium is attached to the uterine end of the ovary. The ovary is located immediately in front of the uterus, at a distance of about 0.5cm. The tube is 5 to 6cm long, and 1 to 3mm wide.

Mesovary and mesotubarium are inseparable. In front of the uterine horn is an abdominal fold, in which the tube terminates laterally. The ovary is attached to the middle layer in such a manner that it does not connect with the lower margin of the fold. The ligamentum suspensorium lies in the middle portion of this fold. The tube leads laterally past the ovary, widens out and then becomes crinkled; it then extends cranically twice as far, doubles up and returns toward the ovary and widens out into the infundibulum, the medial lip of which approaches the anterior end, and the lateral lip approaches the extremitas uterina of the ovary. This entire bent portion has the shape of a thimble, or if one wants to use the comparison, the shape of a high hat, which has its open side and the rim toward the ovary. A small branch of the rim leads as fimbria ovarica toward the margo mesovaricus, but does not unite with it. Thus, the ovary of the cat is not situated in a closed pocket; being covered laterally only. Medially it is visible and may be surrounded more or less by the infundibulum. The relationship is very simple and clear. The tube surrounds the ovary laterally, forming a wide sac, the front end of which is pushed underneath the ovary in which the ova are certain to drop.

The uterus of the cat may barely be termed a dolichocornual. At the par sindivisa, corpus and cervix are indistinguishable. In comparison to the horns, the wall of this part is stronger, and the mucosa too appears different macroscopically. In relation to their short lengths, the horns are quite thick. That applies also to the septum which after union continues to lead toward the cervix. It is thick, and 2cm long. The mucosa appears in form of a broad longitudinal ridge, slanting or spiral in relation to the position of the axis of the horn. The external orifice possesses the same relationship to the vagina as in the dog. The dorsal vaginal wall is the direct continuation of the cervix, while ventrally, the cervix forms a projection toward the vagina. Here, a circular fold originates.

The vagina is about 4cm long; the vestibulum occupies about one-half of this length. The relatively long and wide urethra terminates in a deep furrow of the mucosa. Orifices of the ductus paraurethrales are not visible to the naked eye. To either side, equidistant from the urethral orifice and the clitoris there is a thin pore which appears as a ridge when the organ is spread out upon a firm surface. On the outer side is a gland, the size of a hemp seed, the glandula vestibularis major. In the ventral median line, just before the transitional zone to the outer side of the skin, there is a reddish dimple. Two curved, caudally convergent red stripes (erectile reticulated tissue), situated between the corpus clitoridis and the mucosa, lead toward it.

The clitoris must be searched for on the outside. Its pelvic origin is characterized by the stumps of the musculi ischiocavernosi. It is about 1cm long, and 2mm wide. It consists of the corpus clitoridis, and the tip, which, however, is barely visible to the naked eye. The whole structure terminates bluntly in the mucosa of the vestibular base. The end of the clitoris is formed by the bottom of this depression, but may protrude during the state of erection. On the whole, the wall of the vestibulum is cavernous. A separate bulbus vestibuli is missing.

Reference: No. 245.

Male Urogenital Apparatus

IN THE male cat the short penis does not lead between the thighs in the direction of the navel, but from its root remains pointed posteriorly. Thus, the dorsum penis is situated ventrally, and the urethra dorsally.

The penis of the male cat has no resemblance to that of the dog. Though it possesses an os penis (3-4mm long), it has neither a protuberance of the glans penis, nor even a glans penis, but merely a simple terminal cap (10mm long). The end of the penis is no bigger than the rest of the penis, and terminates in a tip. The tip is furnished with about 120 papillae prominentes which point toward the root of the penis.

The pars pelvina urethrae of the male cat differs essentially from that of the dog. In contrast to the dog, the cat does not have a pars glandularis of the ductus deferens, but the bulboglandulae Cowperi are well developed in the cat, possessing almost the size of the prostate. The pars pelvina urethrae is about 50mm long. On its dorsal surface, almost in the center of its length is a glandular body, 10mm in length, consisting of four flat, rounded prominences; the caudal prominences unite. The ductus deferentes thrust themselves between the two vesical prominences (located in the structure of the urinary bladder). Undoubtedly, the glandular body represents the prostate, but certain circumstances favor the opinion that it contains the glandulae vesiculares, which otherwise would be missing. The two posterior prominences form a paired corpora prostatae, united in the median line. The two anterior prominences may be considered either a more or less independent anterior lobe of the prostate, or as glandulae vestibulares, or as its equivalents. The latter conception is in agreement with the anatomical situation. The glandulae vesiculares are situated far distant from the urinary bladder, a feature they possess in common with the prostate which aberrantly from that in other animals is also far removed from the neck of the bladder. On the other hand these glandular vesical lobes possess exactly the same position relative to the ductus deferentes as the glandulae vesiculares in other animals. Inside the urethra is the colliculus seminalis, below the glandulae vesiculares. It forms a round prominence at the end of a long crista urethralis (depending on the caudal displacement of the colliculus). To the side of the colliculus, and caudally from it terminate a series of glandular excretory ducts, at either side.

Immediately in front of the crura penis are situated a few round glands, the size of a pea, which are readily recognizable as the bulboglandulae. Between the urinary bladder and the first layer of glands, the urethra (pars praeprostatica) is thinner than between the two glandular layers. In relation to the anterior glands, the Cowper's glands are large; measuring 4 by 5mm.

Caudally from the bulboglandulae there is a medium sized depression in the mucosa of the urethra, into which the two excretory ducts terminate.

Reference: No. 245.

Prontosil in Toxemia in the Cat

Following oöphorectomy, a kitten, two months of age, developed pyemic septicemia[3]. In spite of surgical interference, the cat became gradually prostrate; the temperature rose to 105.5°F. Food was entirely refused; death seemed imminent. Since it was apparent that the condition was one of acute toxemia, 1.5cc of prontosil were injected intramuscularly. Three hours later the temperature had dropped two degrees. The cat seemed definitely brighter, and was even cleaning itself. At the fourth hour it passed urine dyed vermillion color by the action of the drug. Improvement continued and at the twelfth hour the cat fed voluntarily. Repetition of the dosage the following day decreased the temperature to 102°F. After another treatment recovery eventually occurred.

[3] Kirk, H. 1937. Toxemia in the Cat. *Vet. Rec.* 49:265.

Wounds of Cats

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HOWARD J. MILKS

THE SUBJECT, wounds of cats, brings up the question as to why it is necessary to discuss the matter at all. In other words, in what essentials are wounds of cats different from those of other animals? In general, the principles are the same but certain things must be kept in mind.

First, the serum of cats is very sticky, so much so that small punctured wounds, and these are the most common ones, are effectively closed; and if any infection has been introduced on the claws or teeth making the wound, an abscess almost always results. In this connection also, the fur is so fine that it often confines any small amount of pus resulting in an abscess.

Secondly, the extremities of cats are small and the bones close to the surface. This means that bite and claw wounds frequently injure and infect the bones or joints, particularly of the legs, tail and posterior part of the spine. Many more or less insignificant appearing wounds are of this class. There appears to be just a small puncture wound in the skin, but it does not respond to ordinary wound treatment and persists in discharging a small amount of pus. Occasionally one will heal, but within a few days in its vicinity a small, bluish-red spot appears. The skin becomes thin and easily broken through leading to another sinus (the so-called bacillary necrosis). This process may continue until there are numerous scars and sinuses in the vicinity of the wound. If the tail is affected, the process is the same and it is a rather lucky cat that has enough sound tail for an amputation. If one probes these sinuses carefully or dissects one out, invariably a sequestrum of bone, an infected bone, or an infected joint will be found.

Third, suppuration in cats is almost invariably accompanied by necrosis of considerable tissue. Most of us have noticed this at some time in operative wounds, from which quite large masses of necrotic tissue can be removed.

Fourth, cats lick from a wound everything that can be put on, unless covered with a bandage.

Prognosis.—The prognosis depends more upon experience than upon the amount of involvent of tissue. I have become more and more pessimistic over the small discharging wound that has existed for some time and especially if there is a history of repeated healing and opening. These behave as mentioned above and are serious from a prognostic view. We believe that they follow the principles of wound treatment and that there is some reason other than the selection of the right antiseptic why a wound will not heal. A careful examination with a fine probe will ordinarily reveal the actual condition. The owner may then be made acquainted with the seriousness of the condition instead of being disappointed in our inability to cope with what to him is a minor injury.

Wounds of the soft tissues usually heal well, even if large. Abscesses heal promptly as do cuts and tears. I have observed healing of a split palate within two weeks. Fractured mandibles usually do fairly well if approximated and held by wiring the teeth.

Treatment.—First, clip and shave the hair around the wound so that drainage is facilitated. Then, make a thorough examination before starting treatment. If one of the bones of the digits is found infected or a joint infected, it may be necessary to make an incision on the top side, scrape the bone, or remove the bone or entire toe. When one of the larger bones is affected a leg amputation may be necessary or the case may be hopeless.

It appears unnecessary to go into an extensive description of the surgery that may be involved. We try to decide each case on its merits and be as conservative as possible. One can be sure that it is not the fault of the antiseptics employed that prevents healing. There is a sequestrum of bone, necrotic bone, or an infected joint or otherwise these small wounds would heal spontaneously. Wide opening of the surface is not ordinarily enough; the offending material must be *removed.* Wounds of the tail and rump region are cleaned and examined in the same careful manner. Frequently an amputation of the tail is necessary and the quickest way out, but more often it is done as a last resort.

Our feeling is that something to encourage drainage is more useful than strong antiseptics, since we cannot hope that anything is going to penetrate deeply against the natural flow of excretion. Therefore, we use packs, moistened not wet, with some non-irritant antiseptic, the purpose being to make the pack serve as a wick to encourage free discharge from the wound, and have the pack saturated with some agent which will prevent the multiplication of bacteria that would reinfect the wound. We have found the following agents useful: a hypertonic solution of glycerine (℥10), epson salts (℥20) and water (q.s. ℥40); or 20% ichthyol in glycerine, or even a 2 to 4% boric acid solution or weak chlorine solution. There is more virtue in the damp pack than in the medicine upon it, although we believe the hypertonic pack has given us more satisfactory service than the others. In this solution both the glycerine and the salts appear to encourage the outflow of excretions from the wound. Of course, if there is bone or joint infection, the chance of success of such treatment without other surgery is rather remote.

Wounds confined to the soft tissues heal well if kept clean; no strong antiseptics are necessary. Occasionally one will become dormant when almost healed and need a little stimulation which can be supplied by tincture of iodine, balsam of peru, scarlet red ointment, or one of the newer urea compounds.

Trap Wounds

Each year during the trapping season we have several patients that have been caught in steel traps set for fur-bearing animals. No description of such cases can be given because they are all different. Sometimes a glance will show that an amputation is the only hope, in other cases a little waiting is necessary. It is wonderful what recuperative properties there are in some animals and in some conditions. Then, we can always amputate but cannot restore a limb, so we feel that a little delay does no harm.

Amputations are always made as we see fit and as conservatively as possible. We believe two toes or even one is better than none and therefore we do not amputate the entire foot if it can be avoided.

Pus in Antrum

This condition, really a tooth fistula, occurs in cats as well as in dogs. The symptoms and treatment are the same: i.e., remove the tooth and establish drainage through the alveoli. This drainage is necessary or the wound in the face may not heal. If two fangs of the tooth are diseased, we sometimes have to drain both.

The after treatment is irrigation from the wound in the face down through the alveolus. A few days' treatment is ordinarily all that is required.

Wounds of the Base of the Ears

It is not unusual to have an animal brought to us with both rear legs bandaged because it continually scratches wounds located just posterior to the ears. The history is always the same, that the animal scratches these sores so much that the

owner cannot heal them. The wounds vary in size, some being quite extensive. The skin is usually scratched through in several places and the condition is really due to the animal's digging itself in attempts to relieve the intolerable itching of the ear mange parasites.

Clean the ears and treat for parasitic otorrhea. The wounds will heal promptly if kept clean. The rear legs do not require bandages.

Burns

The most extensive wound that I have encountered was upon an ordinary cat and due to a burn with hot water. It covered an area of several square inches on the rump and one side. This area was devoid of skin and covered with a hard crust when first seen. Our reaction was to kill the animal, since we did not believe the skin could regenerate over such a large area. The owner persisted in having the animal treated. The treatment was no different than for other wounds. We used mild antiseptics and later scarlet red ointment. The wound healed after several weeks leaving a comparatively small hairless scar, not more than one-fourth inch in width and two inches long.

Fractured Palate

This animal had been hit by a car. When first seen, it was bleeding from the nose and mouth; somewhat dazed, but in fair condition.

Examination showed one broken upper canine tooth and a split along the median line of the palate for its entire extent; at the anterior part the split had separated about an eighth of an inch.

An attempt was made to bring the two edges of the palate together with wire around the canines, but it was impossible to keep the wire on the broken tooth, until a small notch was made in it with one of the thin files which accompany ampoules. This solved the difficulty and the edges were brought together with fine copper wire. The wire was left in place for two weeks. At first the animal had a little trouble eating but this was never serious and lasted but a few days.

Conclusion

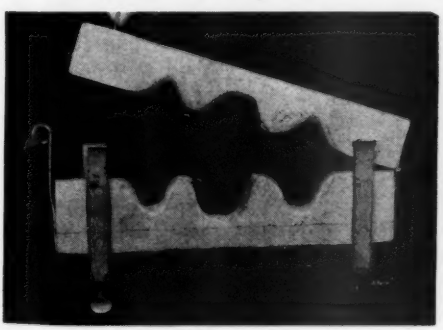
We treat wounds on cats much as in other animals, but have learned that it pays us to make a careful examination. We have no pet antiseptics, and do not believe there is one that will take the place of careful examination and other surgical procedures.

* * * *

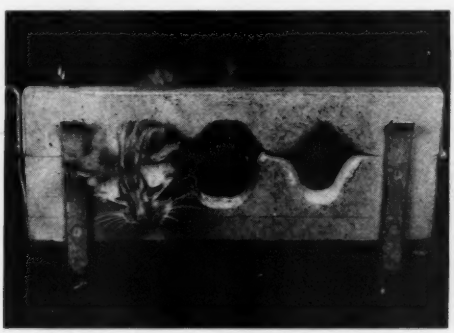
The cat possesses idiosyncrasies in regard to certain drugs, notably to all coal tar products, to morphine which causes delirium, to potassium chlorate which produces hemoglobinuria, and to nauseous tasting drugs, castor oil in particular.—*C. G. Saunders.*

* * * *

In anesthetizing cats, it is necessary to omit morphine compounds, as in these animals it has a stimulating rather than a depressing effect. However, cats succumb to the effects of ether so easily, quickly and safely that there is little object in trying chloroform or any mixture of it.—*E. R. Frank.*



Stewart cat stocks.



Cat stocks such as these used by Dr. Chas. Stewart, are worthwhile for the restraint of cats.

Observations On Oothecotomy of the Cat

By J. A. CAMPBELL, Toronto, Ontario

DURING RECENT years, the technique of excising the ovaries of the cat has undergone evolutionary changes, with the result that the mortality rate following oothecotomy has been greatly reduced. This operation is no longer so hazardous. In the past, veterinarians hesitated to undertake it, since barely 50% of the animals survived.

Formerly the modus operandi was through the median line, where an incision, one and a half to two inches in length was made, and the index finger inserted into the abdominal cavity to located and expose a uterine horn. This method resulted in considerable injury, especially to the wound margin, and to the delicate structures within the abdominal cavity. The danger of infection was great, since a very extensive area was exposed and the use of the finger afforded greater opportunity for invasion by pathogenic organisms with subsequent sepsis. The opening was closed with one row of stitches, in most cases too closely drawn together. The results of the operations were not satisfactory. Even when the cat survived the early exigencies, an inflammatory condition often supervened around the margin of the wound, followed by more or less sloughing. The patient suffered constant pain and soon became debilitated from toxemia and anorexia. Death occurred within a few days.

Cat owners, the majority of whom are of the gentle sex, feel the loss of their pets even more than the owners of dogs, and the necessity of overcoming the unfavorable post-operative sequelae was urgent. Requests for the performance of the operation were increasing, and in response to these needs, veterinary surgeons developed and improved their technique, which has decreased the high mortality rate and reduced the unfavorable results of oophorectomy to a minimum. The greatest improvement has been in the development and use of fine instruments for locating the uterine horns and contacting the ovaries. These permit a comparatively small operative opening. They can be thoroughly and continuously sterilized and lend themselves readily to delicate handling. The use of these instruments is a far cry from the clumsy and unsanitary finger method, and has reduced the hazard of castration in the female cat almost to the level of that of castration of the male cat. With the improvement in technique and instruments, decided differences of opinion have arisen, with regard to the method to be used in the operation. The salient points of the controversy will be considered separately under the following headings: (1) preoperative treatment and preparation of the area, (2) the location and method of making the entry into the abdominal cavity, (3) the manner of securing the ovaries, (4) control of hemorrhage, (5) closing the wound and its protection and (6) the postoperative care of the patient.

The most suitable age for spaying the cat is the interval between the eruption of the permanent teeth and the advent of puberty. Although young kittens are as easily treated as are puppies, they have less resistance to infection. It is therefore advisable to wait until they are more developed before attempting the operation. A reverse condition, however, exists with regard to older subjects. Mature cats undergo this operation more easily than do mature dogs. The attachments of the feline ovary is longer, more elastic, and not so encumbered with fat. The depth of the abdomen in the cat is more uniform than in the dog. All these conditions tend to make it more difficult to securely ligate the blood vessels of an adult bitch, and frequently frag-

ments of ovarian substances are left behind, which nullify to a great extent the object of the operation, as estrum will occur in due course.

The first and most essential precaution in preparing for the operation is to ascertain definitely that the animal is a female. It is difficult to distinguish the sexes in young kittens, and the fact that cats are frequently referred to as "she," regardless of sex, may be misleading. There have been many cases where a laparotomy has been performed and a prolonged search made for the ovaries, only to find that the animal is a male. In addition to determining the sex of the animal, it is also necessary to find out whether it is pregnant. If so, the owner should be advised immediately. In such cases hysterectomy will have to be performed, involving a more hazardous undertaking, and one deserving a higher fee.

An animal undergoing ovariectomy should have an empty stomach to obtain quicker and safer results from the anesthetic. A general inspection should be made to insure that the body is free from wounds; an enema given to remove the feces from the end of the bowel, and the bladder emptied.

Anesthesia

Some operators rely on ether entirely, while many others use nembutal, either per os or intraperitoneally, and complete the anesthesia, if necessary, with ether, as a struggling patient is a serious handicap. The employment of nembutal is most advantageous. This agent fills a long felt want in cat practice, since it is dependable in subduing nervous and excitable animals; furthermore, its prolonged action after an operation induces that state of quietude so desirable for the readjustment of the disturbed and injured tissues. Little or no risk is assumed in its use if dosage is given according to weight.

Preparing the Site for Operation

Many have a strong desire to clip and shave the area for the skin incision, then administer a thorough scrubbing with soap and water, and finally apply such disinfectants as bichloride of mercury, alcohol, tincture of iodine or tincture of metaphen. It has been found, however, that close cutting clippers will remove sufficient hair, while the after effects of shaving are liable to cause annoyance to the cat, and, in any case, shaving produces a somewhat unsightly appearance from an owner's viewpoint.

Methods of Entering the Abdominal Cavity

The most important step in oothecotomy is the site of the portal of entry. There are two decided schools of thought, the first embodying those who prefer to enter through, or near, the median line; and the other advocating a flank incision. Supporting the former is the fact that the wound is out of sight, and the horns of the uterus can be secured through it without difficulty; and if one is accidentally broken off, the other cornua can be located through the same opening. Those who believe that a side opening is preferable maintain that their method possesses the following advantages: There is less subcutaneous fat there than in the median line where there may be an inch or more to contend with; it is away from the mammary glands, the structure and parenchyma of which are of such a nature that if invaded by infection they slough readily; and entrance into the abdominal cavity is directly above, or very close to, the uterine horn or ovarian attachment, making it an easy matter to secure and pick up. And they further argue that the only suturing necessary with the side opening, even in adult cats, is, as a rule, one stitch, to close the skin incision. The muscle opening, owing to the elasticity of its fibres, automatically closes, and the high location of this aperture in the abdominal wall precludes the possibility of hernia. The abdominal viscera are less apt to become involved if unfavorable sequelae occur in the flank wound, whereas they lie in contact with the wound in the ventral position. Futhermore, a cat will submit with more toleration and less struggling to handling and treatment of the operative wound in the flank region than in the median line.

Securing the Uterine Horn

Just as there are different opinions with regard to the position of the portal of entry, so are there two definite techniques in regard to securing the horn. The advocates of one prefer to use blunt pointed hooks, with jaws one-eighth to one-quarter of an inch wide, depending upon the size of the cat. In most flank operations, hooks are used, with the animal lying on its side and in 75% of cases the horn is picked up at the first attempt. The only difficulty may be that of encountering fat in young kittens or immature specimens, but in adults, fat does not handicap the operation to any extent, even when present. Operators on the median line, who use the hook, elevate the animal's hind quarters when searching for the horn. The forcep users cling tenaciously to the forceps and scorn to use any other instrument. They acquire great skill and a fine sense of touch and, with the cat suspended by its hind legs, are able to go directly to the right spot. The use of forceps necessitates a slightly larger opening to accommodate the jaws of the instrument, and, while in thin subjects there may be no difficulty, in others the presence of fat may cause complications. Except for veterinarians who perform the operation frequently, the hook is more suitable than forceps, and more easily handled.

Hemorrhage

The possibility of postoperative bleeding is not nearly so great in cats as in dogs, and it very rarely proves fatal. Some operators are careful to ligate all the tissues proximal to the ovary in both young and old cats. Others merely take the precaution to crush the blood vessels—even when of large size. The general viewpoint, however, is that hemorrhage should be checked in young subjects by crushing the tissues with Ferguson spaying forceps, and in adults by plain catgut ligatures, applied to the ovarian and uterine blood vessels.

Closing the Operative Wound

During recent years there has been a great improvement in the method of closing the operative opening. Suturing has always been an objectionable feature in the spaying operation. Muscle tissue is particularly sensitive to the presence of sutures and shows a marked reaction. Muscle tissue being a rapidly regenerative structure, and young fibroblasts highly vascular, the infiltration of leucocytes are contributing factors to the visible hyperemia occurring in muscle suturing. Foci of infection that may result in considerable cellulitis, and the formation of deep stitch fissures frequently follow. Veterinarians engaged chiefly in small animal practice are modifying their technique in laporotomies, and are not suturing so deeply, since they have discovered that by confining the sutures to the skin, fascia and aponeurosis, they are enabled safely to close and support the incised wound, with much less reaction and suffering. Many median line operators might justly be called the followers of Flynn since they have adopted the revolutionary method recently evolved by that master of the operation, and dispense with sutures entirely, depending upon adhesive tape to close the incision and support the muscle wound until healing is completed.

Flank operators are not concerned over suturing the muscle opening. They may resort to one or more very fine catgut sutures, just to bring the divided parts of an unusually large wound together, as in the case of hysterectomy. Many materials are available for suturing purposes, all of which have their advantages and disadvantages. Silk, linen, catgut (both plain and chromic) have their advocates, although all three will absorb moisture and swell, causing irritation, with the result that some cats continue to lick the suture, and they may even succeed in removing the stitches. In closing a skin incision, horsehair, because of its smoothness and flexibility has proved the most suitable; silkworm gut lacks pliability and its rigidity when dry may irritate an animal.

Protecting the Wound

Those who use the flank opening find it unnecessary to apply dressings to the wound, which is invariably dry, as it usually heals by first intention. On the other hand, some ventral position operators

continue dressing the wound at varying intervals for six or seven days, or until such time as the stitches are ready to be removed. Many median line operators discourage covering the wound, believing that the heat and moisture so retained in the wound are conducive to the incubation of infection. Other practitioners use small dressings which are held in place by the use of collodion or adhesive paste. With the conformation of the cat, the looseness of the skin, the crouching position which it naturally assumes, as well as its dislike for anything around its body, better results are obtained without any dressings. The anatomical structures of the back are such that fixed dressings are an impossibility.

Postoperative Care

Some veterinarians hospitalize the animal until the stitches are removed, a period of from five to seven days. Others send her home within 24 hours, believing that she responds better in her home surroundings, also having in mind the susceptibility of young cats to highly infectious and fatal gastroenteritis. This condition is especially serious during the late summer months.

Our Method of Operating

For several years we employed alternately the two methods of performing the operation (median and flank), but for some time now have confined ourselves in most cases to the side opening, influenced chiefly by the fact that there seems to be less difficulty with regard to the closing and healing of the wound.

The following instruments are at hand: one small sharp pointed scalpel, one pair of curved scissors, two tissue hooks, a blunt dissection instrument for making muscle opening, one or two blunt pointed hooks for securing the ovaries, a Graefe eye hook for picking up the underlying horn in young subjects, Ferguson's spaying forceps for controlling hemorrhage, triple 0 catgut for ligaturing, and a needle and horsehair for suturing the skin.

Nembutal per os, followed if need be by ether for completing the anesthesia, provides most satisfactory results in anesthesia. When the cat has responded sufficiently to permit handling, an area in the flank, two or three inches square, is clipped and disinfected with alcohol and tincture of metaphen. The surrounding area is saturated with a solution of bichloride of mercury 1/1000. Finally a spaying cloth, with a window in it sufficiently large to expose the operating area, is placed over the cat. In connection with the flank operation, it is very important to have the portal of entry within easy reach of the bifurcation of the uterus, especially in immature specimens. The opening should be made where the muscle walls are thick, which assures more complete closure of the wound which is the most important feature of this operative procedure. The muscle walls become thinner as they reach their posterior attachment and do not afford the required protection against postoperative hernia.

The animal is placed flat, its left side uppermost and the location of the incision is determined by drawing an imaginary line one inch or so downward from the border of the lumbar region, and one or two inches, depending on the size of the subject, from the front of the center of the femur when it is held at right angles to the long axis of the body. The skin incision is made perpendicularly at the juncture of these two lines, about a quarter of an inch in length, which will allow for sufficient enlargement. A layer of fat is exposed, which is picked up with a tissue hook, and excised with scissors until the flesh wall is in plain sight. This is grasped with the point of the tissue hook, and brought into view, where it is firmly held with the left hand. The muscle fibres are separated along their long axes with a blunt dissecting instrument. With mature specimens it may be necessary to use considerable pressure, but with young animals the instrument will enter the cavity with little resistance. When the fibres of the uppermost muscles are separated, another tissue hook is brought into use for securing the second layer of mucles, half an inch or so to one side of the first, and the blunt dissecting instrument is again employed to

separate the fibres, and expose the third layer. When there is no more resistance to the point of the instrument, the entry has been finally completed. The aperture is then held open with a tissue hook in the left hand, the point of which grasps the under surface of the lower layer, while the right hand inserts the hook for picking up the uterine horn. In mature specimens the cornua is usually found lying very close to the aperture; but in immature specimens, particularly those that are in good condition, there may be considerable difficulty, as the accumulation of fat forms a decided obstacle to the search. To overcome this, the hook should be inserted upward about an inch or so, and then pressed downwards. In this movement the fat is pushed down low so as to be out of the way. Next, the hook is introduced a little farther into the cavity and elevated toward the roof of the abdominal chamber and brought outwards. If the required results are not obtained, the cat is held up by the hind quarters, and the viscera shaken down, and the search resumed. After securing the horn, the tissue hook is discarded. It is an easy matter to proceed anteriorly to the ovary, which is removed either with crushing the blood vessels or ligating them. The horn is then followed posteriorly to the bifurcation to secure the underlying cornua. With small kittens there may be some difficulty experienced as the bifurcation is still confined well within the pelvic girdle. The delicate structures of such young animals must be handled gently as they readily tear apart if much tension is exerted. It may be necessary to draw the operative wound as far back as possible towards the pelvis with the blunt and retractor end of the tissue hook and with slight traction the sought-for structure is brought into view and secured with the small Graefe hook just anterior to the bifurcation. If the horn breaks it is advisable to make an opening on the opposite side and secure the right ovary. One authority on the cat advocates this procedure in all cases. Owing to the long attachments it is an easy matter to bring the right ovary out of the operative wound. In the event of pregnancy, and to avoid the necessity of enlarging the opening, each gravid area of the uterus is firmly held against the operative opening. The mass is then stabbed with the point of a knife blade, and the contents pressed out to facilitate the extraction of the horns. If the animal is mature or in estrum, the two horns are ligatured with catgut. With younger subjects they are crushed with forceps and the stump replaced within the abdominal cavity.

After the operation the cat may be discharged from the hospital the same day or the next at the latest, but should be kept warm and quiet until complete equilibrium returns, a matter of a few hours or a whole day, depending on the individual. It should be fed lightly for several days and a report made immediately if it behaves in an unusual manner, such as refusing food, vomiting, evincing pain on movement, or if any swelling appears in the region of the wound. Owing to the nervous disposition of the cat and its resentment at being handled, great care should be taken in the treatment of the operative wound. Should the occasion arise, it is always advisable to profoundly narcotize the cat or give a general anesthetic, as the slightest struggle may cause irreparable damage to the parts under repair, and the fright due to handling and pain may have a harmful psychic effect, bearing on the cat's appetite and well-being. If sloughs should appear, they should be removed by prolonged irrigation with warm saline solution; the use of dry swabs is preferable to wet ones as the dead tissue will adhere better to them. Great care must be taken not to use too much force in removing the necrotic tissue. After removal of the necrotic tissue the area should be treated with tincture of metaphen, which seems to have a very penetrating action.

When the appetite becomes impaired, every effort should be made to build up the animal's strength by the use of tonics and the artificial feeding of lean meat and fish, both raw and cooked, as well as virol, cream and glucose. In such cases it is best to feed small quantities, frequently.

Neoplasms in Cats

By C. C. MORRILL, Manhattan, Kansas
Assistant Professor of Veterinary Pathology
Kansas State College

THE extreme paucity of literature on the subject precludes the possibility of revealing any accurate data on the incidence of neoplasms in cats. One may, by a survey of clinic records, gain some idea as to the relative frequence in which neoplasms in cats are brought to the attention of the veterinarian. Even this, however, does not reveal the incidence of the various types of neoplastic growths, since an accurate diagnosis is often impossible by clinical and gross pathologic evidences alone.

In glancing through the literature, one is impressed with the fact that, as a rule, only the unusual or spectacular cases are examined microscopically and reported; the rest are lumped under the heading, "tumors," and forgotten. Further than that, since both the economic and sentimental values of the cat are, generally speaking, relatively low, the number of neoplasms which escape the veterinarian's attention probably exceeds by far the number presented for treatment.

The writer, since starting a collection of neoplasms of domestic animals in October, 1935, has obtained to date (July 1, 1937) 108 neoplasms. In this series, the various animals are represented in the following order of frequency of involvement:

Dog	39
Cow	31
Horse	17
Mule	14
Pig	4
Sheep	2
Cat	1
Total	108

The one neoplasm found in the cat was an adenoma of the mammary gland.

From a survey of the annual reports of the New York State Veterinary College, it is noted that, during a 22-year period ending with the 1933-34 school year, only 34 neoplasms in cats were encountered, while for the same period 532 cases of neoplasms in dogs were received for treatment. A brief summary of the types of neoplasms met with follows:

	Dog	Cat
Carcinomas	203	25
Mammary tumors (benign and malignant)	33	0
Papillomas	172	2
Sarcomas	21	0
Benign connective tissue tumors	21	1
Unclassified tumors	82	6
Total	532	34

These cases represented about 2% of the total number of dogs presented for treatment and only about 0.4% of the total number of cats presented. Some autopsy records suggest a higher incidence in cats.

This series suggests that one may expect to encounter carcinomas more frequently than any other type. Also, be it noted that neoplasms arising from epithelial tissues constituted at least 76% of those found in dogs and 79% of those found in cats. Lymphoblastomas were not included in these figures since authorities are not in agreement as to whether or not these are truly neoplastic in nature.

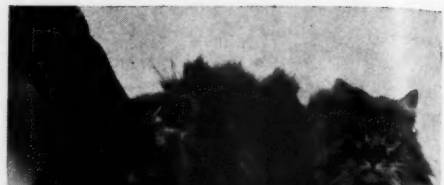
In cats, as in other animals and in the human being, neoplasms are predominantly a disease of old age. Feldman in his monograph, "Neoplasms of the Domesticated Animals," states: "It would seem that although tumors are rather uncommonly present in young cats, a considerable number may be disclosed by necropsy of old cats. The majority of neoplasms of cats are malignant, carcinoma constituting the greatest proportion."

Since there is no bureau of veterinary vital statistics to which one must report the cause of death of each animal which succumbs, it will be necessary that a rather widespread interest in neoplasms of domestic animals be shown by veterinarians before accurate data can be amassed regarding their occurrence. This is *especially* true regarding cats. The task, then, can well be added to the long and growing list of those the fulfillment of which will require cooperative effort on the part of veterinarians in all parts of the country.

Non-parasitic Skin Diseases

In regard to the treatment of eczema in the cat Schreck calls attention to the fact that air and water have a deleterious effect upon eczema. An indispensable preliminary step is to remove all irritation from the inflamed surface. Warm oils may be used in cleaning. These oleaginous substances should be applied in such quantity as to soak thoroughly into the crusts.

In cases of acne, the most common site for which is the back extending from the neck to the tail, Horning and McKee recommend a bacterial vaccine made from the acne bacillus, *Acne diplococcus, Staphylococcus albus,* and *Staph. aureus,* injected subcutaneously.



Moist Eczema.

Chronic moist eczema at the back of the thighs in cats, according to Holmes, is an extremely troublesome skin disease. The greater portion of the trouble appears to be consequent upon licking with a very rough tongue, although there must be some primary irritation to bring this about. The simple use of a lampshade collar to prevent licking, and the application of a sedative, antiseptic lotion, such as calamine lotion, is the line of treatment found to be most successful, but it is to be noted that the collar must be left on for a sufficient period after the lesion has healed; until all sign of irritation has abated.

Another extremely protracted skin disease in cats is the chronic ulceration of the upper lip. Owing to its chronic nature, and its response to treatment with iodine preparations, one might be led to suspect that it is of fungoid origin. Numerous attempts to demonstrate this as a cause have failed, and the histological examinations of a lesion have revealed only staphylococci.

Kirk described psoriasis in a full-grown champion blue long-hair cat. The whole of the nose was devoid of hair, very swollen, and covered with a tightly-adherent layer of black-pigmented scab. The lesion was tender, and attempts at removal of the scab caused a good deal of pain, which it was hardly possible to avoid. At the end of three weeks the cat's face had the appearance of an elephant's hide; it was wrinkled, dark, and hard. "sphagnol" ointment was then applied to the skin. After about three days the scab peeled off, and the skin beneath began to look healthier. This treatment was continued for another week, when it was discontinued. The young hairs were seen to be coming through nicely.

Kirk stated that his office cat developed eczema along the course of the spinal column (a common situation for the disease in cats). Three exposures of five minutes each to an iron-cored carbon lamp subdued the irritability and dried up the lesions very considerably.

Miss Lock states that dry eczema with alopecia is often due to external parasites, *Trichodectes subrostratus* and *Pulex serraticeps.* They cause intense irritation, scratching and loss of hair. Both are successfully dealt with by a derris shampoo. If the condition is not due to skin parasites, it may yield to a change in diet. Cats fed chiefly on fish sometimes suffer from an eczema and recover entirely on a diet of raw meat.

References: Nos. 135, 167, 192, 193 and 249.

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Carbolic acid, creosote, tar, common flea soaps, creolin, naphthol and morphine are all taboo as cat medicines. Salol, iodoform, and strychnine should be used with great care, in very small doses.—*G. B. Schnelle.*

Sarcoptic Mange in Cats

Sarcoptic mange in cats usually starts on the skin of the head, especially around the ears. From there it spreads to the paws, and then to the neck, and, finally, to other parts of the body. The itching is intense. In the beginning one may find flea-bite-like, reddish dots that later grow to the size of a nodule or a vesicle, which when scratched, develop small, brown crusts. The hairs in the affected area appear disarranged and fall out easily. The diseased skin is first covered with flour-like or bran-like scales, which gradually increase in thickness to form firm, greyish-brown crusts. The skin in the diseased area is swollen, giving the cat a peculiar edematous appearance, and becomes quite inelastic, tough and wrinkled. On other parts of the body the crust rarely becomes as thick as on the head.

Not infrequently, scabies becomes complicated with a catarrhal conjunctivitis, which often may be traced to an entropion.

Scabies is not well tolerated by cats. Their general health is disturbed, the appetite wanes; there is disinclination to play, the affected animal becomes weak, emaciated and may die, although the mange may spread but little.

Treatment should be conservative and not heroic. Bathing and washing are not well tolerated. Coal tar disinfectants are fatally poisonous. Fröhner observed symptoms of intoxication following the application of Peruvian balsam. Styrax is tolerated much better. The following prescriptions have given good results.

℞ Flowers of sulphur 18.0
Potass. carbon. 10.0
Adipis 120.0
M. et ft. an ointment.

℞ Lac. sulph.
Glycerin
Sodii carbon. ..... aa 10.0
M. et. ft. a paste.

℞ Lac. sulph. 40.0
Adipis lanae 10.0
Acetis 30.0
Vaselin 20.0
M. et. ft. a paste.

Ear Mange in Cats

The dermatophagus mites collect in the external auditory meatus, where they cause an otitis externa otorrhea. It is accompanied by a profuse, ill-smelling secretion. The cats shake their heads frequently. When the otitis is restricted to one ear, the head is carried obliquely.

This form of mange is poorly tolerated by cats. Fatal cases are frequent. In neglected cases the mites are prone to burrow through the tympanum, eventually setting up a fatal meningitis.

Demodectic Mange in Cats

Demodectic mange in cats is similar to the same disease in dogs. The skin of the head is usually affected first. From there the dermatitis spreads to the skin of the neck. Not infrequently the mange affects the forepaws, around the claws, the extensor side and the inner side of the forearm, up to the elbow. Other regions of the body are usually spared from this type of dermatitis. Demodectic mange in this animal often occurs in combination with sarcoptic mange, as it does in dogs. It may be either of a pustulous or a squamous type. The latter is the rarer form. It is characterized by loss of hair, swelling of the skin and considerable scale formation. Pigmentation occurs more rarely than in the dog, and less intensively.

Treatment is similar to that employed on dogs. The secondary efflorescences are best combated by oily preparations, preferably sulphurated oil. This treatment will often clear up the entire mange condition. Most of the remedies used for red mange in the dog are unsuitable for cats. Coal tar preparations are taboo and oily preparations are not well borne, except for short periods. Building up the resistance of the animal by maintaining a high level of nutrition is important. Good hygiene is essential.

Reference: No. 244.

Hemorrhage is almost always negligible in amputations in the cat.

Ringworm in Cats

CATS become infected with herpes tonsurans very easily. Quite often they acquire the infection from contact with human beings. Numerous cases are on record in which herpes was retransmitted from cat to man. In fact the circumstance that several members of the family are suffering from ringworm is of diagnostic significance in determining if the cat is so affected. The symptoms and the course of the disease are practically the same as in dogs. The most common form of the disease occurring in cats is the *herpes maculosus*. The principal seat is the skin of the head; the parts attacked next are the neck, and the front part of the chest. Usually the disease remains localized in certain, circumscribed areas.

Lock (1934) states that the lesions, little patches of scurf where the bases of the hairs adhere, are about the size of a rice grain. They are distributed evenly all over the body. It is best detected by running the finger tips over the skin.

Rawson (1936) says that the lesions produced by *Microsporon felineum* in cats are small, more or less rounded, raised scaly or scabby areas on almost any part of the body covered by hair. The parts most often affected are the ears, face, neck, back, sides of the body, tail, legs and paws. The scaly or scabby areas seem to cause no appreciable irritation in cats, or appear to produce any systemic effect or toxemia. The hair is not shed on or surrounding the affected parts. If the scaly or scabby areas are small and on parts of the body covered by hair, it is usually necessary to locate them by sense of touch, particularly in Persians or other long-haired cats.

Because of the comparatively benign nature of ringworm infection in some cats, the owner may not notice anything wrong with his animal until the scabby areas become quite numerous or coalesce, forming comparatively large, scabby patches. Mild cases of infection may be erroneously attributed to skin trouble due to dietary disturbance, or in more advanced cases to sarcoptic mange.

Rawson states that a positive diagnosis seldom can be made by microscopical examination alone. A tentative diagnosis can probably be made by ruling out sarcoptic mange, by the possible presence or recognition of the large spores surrounding the hair, by the contagious nature of the infection, by the small, more or less typical scabs on the skin, by the absence of marked irritation in cats, and by the history of the case.

Holmes (1933) states that the application of chloroform, which results in a typical hoar-frosted appearance is a useful guide to the diagnosis of ringworm. The microscopic demonstration of the fungus is easy in the cat. The best material for this purpose is a single broken hair, plucked out by means of epilation forceps, a process in which a hand lens is of service, or, failing that, a pin-head-sized epithelial scale should be taken and warmed in a little liquor potassae, prior to examination under 1/6 objective, cutting down the light.

Wooldridge (1934) mentioned that one could form a diagnosis of ringworm only by microscopic examination of the hair. The puzzle was that in some of these cats one might be unable to find any lesions at all and yet the history was such that one could have no doubt at all that ringworm was present because children playing with them became infected after a period of from one to two weeks.

In the examination of the skin for ringworm, Wood's filter in connection with ultra-violet rays is very useful. In a darkened room one can see infected hairs with a peculiar fluorescence. Wood's filter should be used as an aid to diagnosis, and the fluorescent material should be examined microscopically for confirmation.

In the experience of Rawson, ringworm infection in cats yields readily to the application of various fungicidal agents.

Miss Lock is persuaded that there is no effective cure for this particular skin dis-

ease, and her problem arises in convincing the owners of valuable stock that their cats are suffering from microsporosis and that treatment is useless.

Wooldridge mentioned that he had resorted to various kinds of treatment, salicylic acid in ointment or liniment, and that this appeared to produce improvement, but as these lesions cleared, others cropped up. On several occasions the cats were found to be free from ringworm lesions, and on making another careful search some days later, one again found one or two small lesions.

Levine recommends phenylmercuric nitrate 1 part in 600 parts water and 600 parts wool fat to which mixture is added 10% glycerin, as in the treatment of tinea infection in man.

References: Nos. 123, 193 and 235.

* * * *

Favus

Favus in the cat may develop at any place on the skin. The paws and especially the toes near the claws, and the skin of the head are favorite locations for the fungus. Frequently, favus crusts are found on the abdomen, in the sternal region, the inside of the front legs, and occasionally on the hind legs. Almost without exception young animals are the ones attacked by the disease; favus being exceedingly rare in older cats. Under certain conditions the disease is apt to spread. In 1866 Schindelka observed that all the young cats in one block of a Viennese suburb suffered from favus. Itching has not been observed in cats.

On the less densely haired parts of the body, especially on the legs and ears appear yellowish, rarely grayish-white, circular nodules which protrude somewhat above the skin. The center is somewhat dimpled, presenting the appearance of a cup. As the development progresses, these cup-shaped masses loosen up on the border, become raw on the surface, and exhibit concentrically arranged fissures. Neighboring scutula coalesce and form thick, gland-like crusts. Soon cracks appear on the surface, and the scabs begin to exfoliate. On densely haired surfaces, characteristic favus scutula either form not at all, or are atypical. In these places favus forms usually thick, yellowish-grey to yellowish-white layers of crusts of a tar-like consistency, which causes the hairs to stick together. A characteristic is the peculiar odor of these animals, which is suggestive of mouse urine. The crusts are attached firmly to the hairs. The skin underneath the crusts is depressed, and either dry or slightly moist, either pale or reddened and deeply injected. The skin in the neighborhood of the crusts appears deeper red and slightly thickened. The hair looses its luster, appears dust-covered, is loosely seated and falls out easily. In the later course of the disease, the crusts begin to detach themselves from the underlying skin and are cast off, leaving permanently hairless places of atrophic skin.

The claws of the cats become thickened, loosened, opaque, and brittle. Very often the disease process is restricted to the claws themselves, while the neighboring skin remains unaffected. The fungus threads, found in cases of favus of the cat, are throughout, much smaller in size than those found in favus of man.

Lock (1934) says that favus is easy to diagnose. The typical circular patches with yellow scurf and their typical distribution on the body, paws, head and ears, as spread during the cat's cleaning operations, present no difficulty in diagnosis.

Favus responds readily to iodine applied vigorously as tinctura iodi mitis.

Reference: No. 244.

* * * *

Experiments have shown that the fluke, *Brachylaemus virginiana*, normally parasitic in the opossum, may parasitize the cat.

* * * *

Fish heads, containing strychnine, are, at times, set out to destroy foxes and rats. The finding of ingested fish heads or remains of rats and mice in cats which have died suddenly, justifies the suspicion of poisoning.—*Kitt* (Pathologische Anatomie der Haustiere).

Endoparasitism of the Cat

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Until the fairly recent discovery that the cat is a very satisfactory experimental animal little research has been done upon its parasitic fauna; hence our knowledge of the pathogenesis, pathology, prophylaxis and treatment of feline parasites is rather inadequate. The taxonomist has given ample attention to these parasites but much more resarch is needed upon the other aspects of the problem and particularly upon its public health significance.

Although the cat is the definitive host of many species of internal parasites, comparatively few separate disease entities are caused by them. The three most common are verminous gastritis, ancylostomiasis and enterohelminthic toxemia. These are here reviewed. Several rarer diseases are briefly discussed, and the public health importance of pet animals is indicated.

Verminous Gastritis

Verminous gastritis is a disease of cats caused by nematode parasites localized in the stomach.

Of these nematodes three species occur in this country. The most common, at least in Kansas, is *Physaloptera felidis* (Ackert, 1936). This is a stout ascarid-like worm measuring up to 44mm in length in the female and 29mm in the male and usually found with the anterior end attached to the mucosa. *Ollulanus tricuspis* is a very minute worm, 1mm or less in length, and is found imbedded in the gastric mucosa or lying closely adhered to its surface. This parasite has not been found often in North America, probably because its small size has caused it to be overlooked. *Gnathostoma spinigerum* is likewise, and fortunately, rare in North America for it is considered to be "by all odds the most deadly parasite to which the cat is subject," (Chandler, 1925). The male measures up to 29mm in length and the female 31mm. The adults are found in abscesses in the wall of the stomach.

The life cycle of *Physaloptera felidis* is not known, but it probably involves at least one intermediate host.

Ollulanus tricuspis has a direct life cycle, the larvae being brought forth alive by the female and developing to the infectious stage in the stomach, (Cameron, 1927 and 1932). The presence of the worms stimulates vomition and the infective larvae are expelled with the vomitus. A new host picks up the infection by eating the vomitus. Autoinfection is thus highly probable.

The life cycle of *Gnathostoma* involves cyclops and a fresh water fish (Prommas and Daengsvang, 1933 and 1936). In the definitive host the parasite passes part of its life in the liver where it causes considerable damage before going to form an abscess in the wall of the stomach.

Of these three parasites *Ollulanus tricuspis* causes the least damage. Even heavy infestations of this parasite produce no lesions of the gastric mucosa except mild catarrhal gastritis and epithelial erosions.

Physaloptera felidis causes rather severe erosions at attachment points. Sometimes the presence of these worms causes a severe catarrhal gastritis, and since other members of this genus are blood suckers, (Mönnig, 1934) it is probable that *Physaloptera felidis* is a blood sucker also.

Gnathostoma spinigerum causes a very severe inflammation of the stomach, not only at the sites of the abscesses caused but also in the adjacent tissue. These abscesses contain a purulent sanguinous material and one or several worms and their eggs. The liver shows the results of their migrations since it is a mosaic, with the yellow necrotic material marking the tracks of the parasite.

The severity of symptoms varies with the type and degree of infestation, in other words, with the type of gastritis produced. Invariably there is vomition. With severe infestations the appetite is lost and the animal loses weight and condition rapidly. Nervous symptoms, particularly irritability,

have been reported. In the case of Gnathostoma infestations this picture is usually complicated with icterus and other symptoms of liver derangement. In addition, it is always well to keep in mind the fact that few kinds of parasitism in dogs and cats are uncomplicated.

Diagnosis of the condition depends upon finding the eggs of the worms in the feces or in the case of *Ollulanus tricuspis* the infective larvae in the vomitus. If stomach worm infestation is suspected the practitioner should give the vomitus a careful microscopic examination. In routine examinations it would be rational to induce vomition with an emetic or to obtain from the stomach by means of a stomach tube some gastric contents for examination.

No treatments of this condition have been reported.

Ancylostomiasis

Ancylostomiasis is a specific disease of cats caused by certain members of the nematode family Ancylostomidae invading a host that is usually young or on an iron-deficient diet.

Although ancylostomiasis is not noted as often in cats as in dogs, there is a strain of *Ancylostoma caninum* particularly adapted to the cat (Scott, 1929).

According to Stiles and Baker (1934) four species of hookworms occur in cats in North America. Of these *Ancylostoma caninum* is the most common. *Uncinaria stenocephala* while primarily a parasite of foxes on this continent is next most common in incidence since *Ancylostoma brasiliense* is limited in its distribution to the southern-most states. *Ancylostoma duodenale* has been reported only from an experimentally infected cat.

The ancylostomes are small, slender, red or greyish worms. The male may attain a length of 12, the female of 20mm. They are almost invariably attached to the mucosa of the small intestine, the attached end usually being bent dorsally.

The eggs, which are already in the early stages of cleavage, are extruded by the female and passed out in the feces. If the proper conditions of temperature and moisture obtain, the eggs hatch in from three to six days; three days more are needed for the first molt and eight days for the second at which time the larvae become infective. The infective larvae gain entrance to the body of the host by either penetrating the skin or by being ingested with food. If the infestation is through the skin the larvae penetrate a blood vessel and are carried to the lungs where they leave the vascular system, penetrate into the pulmonary alveoli and are coughed up and swallowed, developing to maturity in the intestine. According to Schwartz and Alicata (1934) the parasites gaining entrance to the body by the mouth probably develop in the intestine with no migration. However, the experiments of Foster (1932, 1935) indicate that migration of larvae from the intestine does take place at least to some degree in an age-resistant host, since he demonstrated prenatal infestation in puppies after infecting the dam per os during pregnancy. Two further molts and about five weeks must pass before the parasites reach maturity.

Animals which are kept in crowded damp quarters are most liable to suffer from the disease as are animals which are on an iron-deficient diet, since Cruz (1934) has shown that an iron-sufficient diet tends to prevent the symptoms of the disease from appearing even in fairly heavy infestations while a few parasites can cause serious illness when the host is suffering from lack of iron. Foster (1936) has confirmed this in the cat.

The principal damage to the host is occasioned by the blood loss caused by the parasite. Wells (1931, a, b) and Nishi (1933) have observed the live hookworm attached to the intestinal mucosa literally pumping blood out of the host's body. In addition there is the damage caused at the attachment points by the teeth of the hookworm and the loss of blood after feeding (Ackert and Payne, 1923). The parasites probably secrete a foreign protein of some sort since the eosinophilia in ancylostomiasis is probably a foreign protein reaction (Cruz 1936). According to Loeb and Smith (1904) and Loeb and Fliescher (1910) hookworms produce an anti-coagu-

lant. Many of the country's outstanding practitioners are convinced that the hookworm infested animal is a poor operative risk, since they believe it quite often suffers from hemophilia. In cases of very heavy infestation the larvae may produce a pneumonia during their passage through the lungs.

Cort (1932) has distinguished four types of ancylostomiasis. For the purposes of description we can best distinguish between three types. The first and rarest type is the result of prenatal infestation. Whether or not it occurs in cats is a question. In puppies it appears about three weeks after parturition. Up to that time the puppies seem perfectly normal, but they suddenly develop symptoms of toxemia and quickly pass into a coma which usually leads to death. The other outstanding symptoms observed are those of an unusually severe anemia.

The second type includes two of Cort's (1932) types. This is the acute form of the disease and may occur in very young animals or in animals in which the resistance to the disease has been lowered by a deficient diet. The symptoms which accompany this type are those of a progressive, severe anemia. The animals are emaciated, weak, have a rough hair coat and often a black diarrhea. Their mucous membranes are pale and they may suffer from epistaxis.

The chronic form of the disease which occurs in animals that have developed resistance usually causes laziness and perhaps the symptoms of a slight anemia. Epistaxis has been observed. It is in this type of infestation that the possibilities of hemophilia should be considered.

According to Foster and Landsberg (1934) the anemia of ancylostomiasis is a typical microcytic, hypochromic, anemia. Fatal infections show a steadily dropping decrease in red blood cells and hemoglobin, anisocytosis, slight poikilocytosis, achromia and a few nucleated erythrocytes (Landsberg and Cross, 1935). An eosinophilia is usually present but its degree is not commensurate with the severity of the symptoms (Cruz, 1936).

Post-mortem lesions of ancylostomiasis vary with the severity of the symptoms shown. There may be merely a few erosions at the point of attachment of the worms or there may be a severe catarrhal, or at times, hemorrhagic enteritis. Varying degrees of emaciation, anemia and its accompanying phenomena such as ascites and anasarca are observed. Fatty degeneration of the liver has been found.

Diagnosis of ancylostomiasis is based upon finding the typical hookworm eggs in the feces, or the worms upon post-mortem examination, of an animal showing the symptoms described in the foregoing.

Prophylaxis of this disease aims at preventing the young animal from becoming infected until he has developed some age resistance and by keeping the older animal on an adequate diet. Prenatal infestation can be prevented by worming the queen before or shortly after she is bred and keeping her confined in dry sanitary quarters where it is impossible for the hookworm larvae to find enough moisture to develop. (Only a slight film such as that provided by daily dew on grass is needed). She should have her feces checked regularly during pregnancy to make sure that the sanitary methods are effective. The kittens should be kept under the same regimen until they have attained most of their growth. Older animals should have their feces checked regularly several times a year and be kept on an adequate diet of iron.

Treatment of ancylostomiasis in cats presents several peculiar problems, since cats are so susceptible to the poisonous principles in the common anthelmintics. However, the first move is to institute daily treatments with some easily assimilable iron salt in order to build up the animal's blood as soon as possible. In very severe cases, blood transfusions are indicated. In the case of weak, prenatally infected puppies Doctor Covault (Iowa State College) has recommended one drop of a solution of one part of oil of chenopodium and two parts of mineral oil once a day. This should be effective in kittens as well. Tetrachlorethylene in the dosage

of 0.2gm per kilogram of body weight is widely recommended for ancylostomiasis in both dogs and cats. Recently hexylresorcinol has been recommended as an anthelmintic for ascariasis (Lamson and Brown 1931) and ancylostomiasis (Yutuc and Tubangui, 1935) in dogs. A considerable amount of work has been done on this drug in human beings. Its chief virtues are its comparative effectiveness and nontoxicity. Especially because of the latter virtue hexylresorcinol should be given a thorough trial on cats by the practitioner. Lamson and Brown (loc. cit.) recommend 0.6 to 1.0gm to a dog followed by 30cc of mineral oil. Since the drug combines with protein it is recommended that the animal be starved 24 hours before and five hours after the treatment for greatest effectiveness. No ill results seem to follow repetition of the treatment over a long period of time.

Enterohelminthic Toxemia

Enterohelminthic toxemia is a term coined by the writer to indicate the apparent toxemia and associated symptom complex caused by the presence of worms in the intestine. Because ancylostomiasis typically results in a clinically different syndrome it is considered separately.

Many representatives of the tapeworm and roundworm classes and probably (although it has not been reported) the fluke classes can cause the condition. In North America the following have been reported: members of the genera Dipylidium and Taenia, and the species *Diphyllobothrium latum, Echinococcus granulosus, Mesocestoides latus, Toxocara mystax, Toxascaris leonina, Echinopardalis pardalis* and *Oncicola canis.*

The first five of the foregoing list are tapeworms, of which the first two are the more common. *Taenia taeniaformis* is the most common single species of cat tapeworm in the United States. All of the tapeworms are easily recognizable by their large segmented bodies with the possible exception of *Echinococcus granulosus* which can be overlooked easily because of its small size. It is a good general rule to make a microscopic examination of the parts of a carnivore digestive tract which show evidences of inflammation on autopsy. Thus one can avoid overlooking some of the smaller helminths. *Toxascaris leonina* and *Toxocara mystax*, the common ascarids of the cat, are familiar to all practitioners. *Echinopardalis pardalis* and *Oncicola canis,* thorny-headed worms, are rare in this country.

The life cycle of Dipylidium involves the flea as the intermediate host; that of Taenia usually a rodent; Mesocestoides probably some mammalian intermediate host. *Diphyllobothrium latum* infestation is passed to the cat from fish. The roundworms have a life cycle like that of Ascaris with no intermediate host, although migration through the lungs does not occur as often as in other ascarids (Wright, 1935). Prenatal infestation may occur. Not much is known of the intermediate hosts of the thorny-headed worms although their life cycles are undoubtedly not direct.

The pathogenicity of enterohelminths is rather a complex problem. Ofttimes they produce no noticeable symptoms even with very heavy infestations, or again a very few of them may cause a severe illness. The resistance of the host is a very important factor. Generally speaking, older animals are more resistant than young; in other words age resistance is operative. Then too, there is a definite limit to the number of worms a cat may harbor. Cats are resistant to superinfection with roundworms (Sarles and Stoll, 1934). On the other hand this resistance may be lowered through factors such as a deficient diet. A-avitaminosis markedly decreases the resistance of a dog to a close relative of the cat roundworm (Wright, 1933). Much work needs to be done on the disease producing mechanisms possessed by enterohelminths. Most of them probably produce in greater or lesser amounts a hemolytic toxin (Schwartz, 1921) and probably other toxic substances (Shimamura 1925). Whether these are a metabolic product or an endotoxin liberated on death of the parasite (Guenther, 1936) has not been determined. These parasites take food from the host. Their presence affects

digestion and especially peristalsis so that the host not only suffers from lack of nourishment but may also develop intussusception, impactions or biliary stasis. The enteritis that they produce by attaching themselves to the gut wall or by irritating it with their bodies undoubtedly is responsible for the nervous symptoms produced, since intestinal irritation often causes reflex disturbances in the central nervous system. The eosinophilia and dermatitis observed probably are allergic reactions.

To enumerate all the possible symptoms is beyond the scope of this article. Suffice it to say that the characteristic picture is one of emaciation, anemia, "pot-belliedness," (particularly in ascariasis), rough coat, alopecia, eczema, discharge from the eyes, temperature frequently subnormal, alternate diarrhea and constipation, pruritus and depraved or abnormally large appetite. Epileptiform and sometimes rabidiform convulsions are common or the animal may be extremely depressed. Any, all or none of these symptoms may be present.

Post-mortem examination of an animal suffering from severe enterohelminthic toxemia reveals an emaciated, anemic, often hydremic and sometimes dropsical carcass. Usually when a heavy infestation of helminths is present in the intestine it may show pathological alterations ranging from a chronic catarrhal to an acute diptheritic enteritis.

Diagnosis of the condition is dependent upon the symptoms and finding the parasite eggs or segments in the feces. As a general rule every negative fecal examination should be repeated at least twice at intervals of a week. The most widely recommended type of fecal examination involves the use of the centrifuge (Benbrook, 1929, and others). Salt flotation methods although accurate enough to serve in emergencies are not as reliable or as quick as centrifuge methods.

Correct treatment depends upon correct etiological diagnosis. For ascarid infestation the same anthelmintics as are recommended for ancylostomiasis are used. Hexylresorcinol may be effective against both roundworms and tapeworms. (Clapham, 1932). For tapeworm infestation Parker, (1937) recommends arecoline in the dosage of 0.1 grain for adult cats and one-twentieth grain for kittens. This should be followed with a soda enema and the treatment repeated in ten days.

Other Parasitic Diseases of the Cat

Parasitic Hepatitis.—Parasitic hepatitis is not very common in North America although it has been reported (Essex and Bollman, 1930). It is caused by flukes belonging to the genera *Opisthorchis* or *Parametorchis* and by the larvae of *Gnathostoma spinigerum.* Liver fluke disease is characterized by proliferative changes involving both the connective tissue and the epithelium of the liver, the latter sometimes resulting in carcinoma (Mönnig), 1934). The worms and their eggs may be walled off leaving abscesses or cysts. Gnathostoma infestation is characterized by a yellow mosaic-like marking of the liver, the marks indicating the paths of the Gnathostoma larvae as they wander through the parenchyma producing necrosis on the way. The symptoms of the disease are the result of the liver damage and may include those of obstructive jaundice, cirrhosis, or carcinoma.

Diagnosis of liver fluke disease depends upon finding the eggs in the feces. Infection of the cat may come from eating raw fish. Prophylaxis is obvious. Treatment is not very satisfactory and unless the animal is of great value it should be destroyed as a menace to other cats. Fuadin in doses of 0.4gm per kilo subcutaneously has been recommended by Erhardt (1932).

Verminous Pneumonitis.—In cats *Paragonimus westermanii* the lung fluke, *Aleurostrongylus obstrusus,* or *Eucoleus aerophilus* are sometimes the cause of pneumonia. Heavy infestations of *Dirofilaria imitis* might conceivably result in pneumonia also.

In Paragonimus infestations, according to Price (1929), the flukes are walled off in cysts containing in addition to the parasites a dark brown semifluid mass composed of lung tissue, blood and eggs. The adjacent tissues are inflamed; a pathognomonic symptom is the expectoration of

blood. Diagnosis is made from microscopic examinations of the tracheal exudate.

Aleurostrongylus abstrusus usually does not cause severe disorders in the cat. Cameron (1927) believed that these parasites lived in the branches of the pulmonary artery, the eggs laid in the blood vessels causing infarcts wherever they lodged in the lungs, the larvae hatching out and leaving the body by way of the trachea and digestive tract and the life cycle involving a mouse. Hobmaier and Hobmaier (1935) however, claim that the worms are not in the arteries but in the bronchioles and that the life cycle involves primarily slugs and snails and only secondarily other animals, such as rodents. Diagnosis of this condition is made by placing a drop of water next to some feces on a slide and examining it for larvae after allowing the preparation to stand fifteen minutes. Treatments have not been tried enough to warrant recommendation.

Euroleus aerophilus, which is the common lungworm of the fox, occurs in the cat as well. Its life cycle is direct, the eggs are lemon shaped, being easily recognizable by the presence of the polar plugs. Treatment is accomplished with a trachea brush.

Filariasis.—Dirofilaria imitis of the dog occurs also in the cat, causing the same syndrome of easy fatigue as is noticed in the dog, hence cats should be as regularly examined for heartworms by use of blood smears as dogs. Fuadin, as recommended for liver fluke disease, should be used in the treatment.

Coccidiosis, is fairly common in cats and is like most parasitoses in being most severe in young animals, although apparently an active immunity to the condition can be developed. Three species belonging to the genus *Isospora* are commonest in causing the disease in this country. The chief symptom is a severe hemorrhagic diarrhea. This usually precedes the appearance of oocysts in the feces. The blood picture shows an eosinophilia. To date treatment of coccidiosis is for the most part symptomatic. We have never found or heard of one that was really effective.

Cat Parasites and Public Health

There is a tendency to assume the traditional "frightened ostrich" attitude whenever an attempt is made to show the very important health relationships between pets and their owners. Such an attitude is extremely short-sighted. The pet-owner who understands that the only safe pet is the clean healthy pet makes a valued client for the practitioner. Cats do not often transmit disease to human beings, but the pet owner who knows that such events when they do occur are usually the result of inadequate care of the involved pet will never hysterically destroy his cat as a possible menace to health and his knowledge will make him a valued ally for the veterinarian in combating unsound pet-regulating legislation and propaganda.

Some parasites of the cat may be directly transmitted to man; in other cases the cat may aid in the spread of human parasites. Among others Stiles and Baker (1935) list the following parasites of the cat as being of public health importance to man:

Endamoeba histolytica (The cause of amebic dysentery in man. Although the normal occurrence of this parasite in cats is not known, the cat is an excellent laboratory host for this protozoan),

Coccidia of the cat,

Paragonimus westermanii (the lung fluke),

Diphyllobothrium latum (the broad fish tapeworm),

Taenia (various species),

Dipylidium (various species),

Ancylostoma brasiliense (the larvae of which cause a creeping eruption in man),

Dracunculus medinensis (the guinea worm),

Gnathostoma spinigerum.

Ascarids.

The ticks and fleas that infest cats can be transmitted to man causing annoyance and may also possibly carry disease.

The elimination of danger from these parasites involves the cooperation of three

agencies: the community, the veterinarian, and the pet owner. The work of the community involves the elimination of all stray animals. The work of the veterinarian involves the thorough examination of all pets at least twice a year. The work of the pet owner himself, which is probably the most important single item on the program, involves the care of the animal, keeping a sharp lookout for sickness, and the care of the animal's diet and the elimination therefrom of raw meat and fish and the neighbor's garbage. The whole program depends upon the education of the public and the education of the public about such matters rests for the most part upon the veterinarian.

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References: Nos. 1, 2, 14, 34, 35, 36, 40, 41, 45, 52, 53, 71, 72, 82, 83, 104, 121, 181, 183, 194, 195, 218, 220, 221, 226, 231, 232, 240, 252, 253, 254, 258, 272, 283, 284, 304, 305, 306 and 310.

Blood Analysis

Coagulation time: 1 to 3 minutes; Specific gravity: 1054; Amount of blood in body equals 6½% of the body weight.

Respiratory Exchange

The cat consumes 699cc of oxygen per hour per kg. body weight and produces 549cc of carbon dioxide per hour per kg. body weight. The R.Q. is 0.8.—*Dukes.*

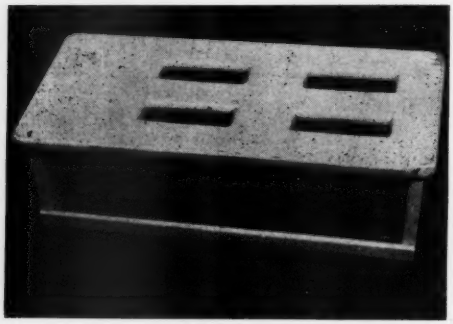
Little leather "boxing gloves" tied on the feet are often worthwhile in restraining a cat. Adhesive tape around the mouth is a clever help.

Composition of Cat's Milk

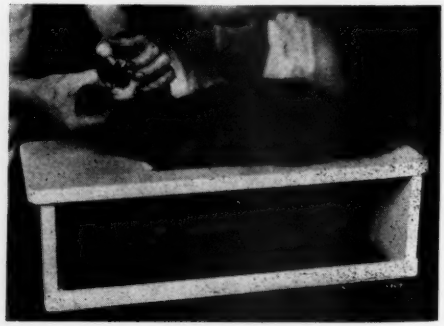
Water 81.63%, solids 18.37%, protein 9.08%, fat 3.33%, sugar 4.91%, salts 0.47%.

Urine Analysis

Amount in 24 hours: 1/10 to 1/5 liter; specific gravity: 1030.



A cat stand is a convenient hospital appliance.



The cat stand in use.

Diphtheria in Cats

DIPHTHERIA is an acute, contagious and infectious disease, characterized by a diphtheroid inflammation of the larynx and the tonsils; occasionally, the lungs may be involved. (H. Kirk.) In catteries the disease assumes an enzootic form.

Symptoms: The animal shivers, the appetite fails, or if retained, there is hesitation in partaking of food. There is a slight discharge from the eyes and nostrils. Salivation commences, and as the condition grows more severe the mouth is held partly open. One might be led to believe that a foreign body had become lodged in the throat or mouth. There are swallowing or gulping movements, a dull, croupy cough, loss of flesh, and perhaps some emesis. Inspection of the buccal cavity reveals a localized or generalized inflammatory condition of the larynx, soft palate, and back of tongue. In some cases there may be noticed patches of grey, yellow, or greenish false membrane, concealing ulcerous surfaces beneath; in others this diphtheritic membrane may extend over the whole of the throat. The larynx is also affected. As the mucous membrane and the neighboring lymph glands become more swollen, and the false membrane increases in thickness, respiration is rendered increasingly difficult. Often, there is a peculiar noisy breathing as if the throat were paralyzed. Sneezing may be frequent. The symptoms of a general septic infection are also present. Emaciation is extreme, and the patient becomes exhausted. The cat cannot stand up, becomes comatose, and dies either quietly, or in convulsions. The mortality is about 90%. Many cats die from intoxication before false membranes have had time to form.

Smythe (1934), mentions that in a number of cases one encounters the vomiting of a yellowish, mucoid fluid, but that vomiting is less severe than in infectious enteritis. Kittens and adult cats are affected. They appear depressed, but the leading symptom is revealed only on examination of the mouth. The lower jaw is seen to be moist from dribbling saliva. The tip and the edges of the tongue are inflamed in the early stages, but when the animal is presented for examination, one usually finds that the condition has developed into ulceration. These ulcers always occur on the anterior third of the tongue; they may be multiple and the size of a millet seed, but the common picture is that they have coalesced throughout the whole of the upper surface of the tongue in its anterior third. Occasionally, the under surface also is denuded of its epithelial covering. The cat will go to a saucer of water, and endeavor to lap, but seldom completes the act.

Krembs and Seifried (1936) mention that cat diphtheria (cat pharyngitis) is characterized by a diphtheroid inflammation of the larynx and the tonsils. Occasionally, the lungs may be involved. The lesions resemble somewhat those seen in infectious laryngoenteritis, but in diphtheria there are never any intestinal lesions present. Nausea and vomiting are not pronounced.

Treatment: The diphtheritic deposit should be removed carefully, and the inflamed surfaces beneath painted with solutions of hydrogen peroxide and other mouth washes, all sufficiently dilute to avoid any irritating effect. The inhalation of steam will expedite the natural expulsion of exudate by a process of suppuration.

Great importance must be attached to the maintenance of the patient's strength. It is usually necessary to administer stimulants almost from the beginning. Among the best of these Kirk names strychnine, digitalis, ammonia and camphor. Diarrhea or other exhausting complications must be stopped. The diet should be liquid and nourishing. Rectal feeding may be resorted to. In acute dyspnea it may be necessary to insert a tracheotomy tube. The cat must be isolated from other animals.

References: Nos. 93, 156, 179 and 263.

Tonsillitis in Cats

Streptococci inhabit the alimentary tract of cats as commonly as they do that of man and other mammals (Broadhurst). Streptococcic infection of the tonsils in cats is, therefore, easily explainable. According to Horning and McKee, tonsillitis in cats occurs in the majority of cases when the animals are between six months and two years of age, although the condition has been noticed in kittens two months old. Tonsillitis is an inflammation of the mucous membrane and glandular structure of the tonsil, due to streptococcic infection, often complicated by secondary invaders. The most common type is the acute follicular tonsillitis. In this ailment the tonsils undergo considerable enlargement. In some cases the crypts are filled with mucous pus and bacteria; occasionally pseudomembranes may be present. The usual symptoms are sluggishness and refusal to eat. The inflamed tonsils cause difficulty in the movements of the jaws, and in swallowing. Local treatment consists in giving a laxative, and in swabbing the tonsils daily with a dilute solution of tincture of iodine. There is a tendency to recurrence of the ailment; permanent relief is obtained by the removal of the diseased tonsils.

The faucial tonsils (*tonsillae palatinae*) are ovoide, reddish structures, 1.5 to 3cm in diameter, situated ventrally from the *fossa supratonsillaris,* between the anterior and posterior pillar of the fauces, on each side of the oropharynx. The outer surface is covered by a fibrous capsule from which the reticulum of the connective tissue, supporting the lymphoid structure, is derived. In close relationship to this surface is the palatine artery. The pharyngeal (guttural) tonsils (*tonsillae para-epiglotticae*) are spherical bodies which cause the mucosa to be raised. They occupy the posterior pharyngeal wall. These structures are occasionally missing in the cat. The lingual tonsils develop over the posterior third of the tongue.

In tonsillectomy the patient is placed under general anesthesia. Once relaxed, a tube is placed in the trachea and the animal is allowed to inhale ether. A bite-block is placed between the teeth, and the faucial, pharyngeal, or lingual tonsillar tissues are extirpated by blunt dissection. An assistant depresses the tongue and holds the bite-block in place, while the operator presses inward from the outside near the angle of the jaw. The curette is placed back of the enlarged tissue, which is carefully scraped. This process is repeated on the other side. The parts are then swabbed with sterile gauze dipped in dilute tincture of iodine.

Prognosis is favorable. Otitis and quinsy are possible complications. Less frequent secondary conditions met are endocarditis, pericarditis, and pyemia.

Reference: No. 133.

Don'ts

Don't pick up cats by the front legs. Legs are sometimes broken by so doing. Grasp them around the body, just behind the front legs. At this point the body balances nicely in your hands, and there is no danger of injury.

Don't pick up cats of any age by the skin of the neck or back. This hurts them unnecessarily.

Don't lose your temper in handling cats. Remember you are presumably of superior intelligence. But when you lose your temper, it might be well to hesitate long enough to analyze the situation, and try to determine which is of superior intelligence.

Don't torture a cat or kitten by the promiscuous use of worm medicine.—*J. M. Vernon.*

Oxytocic Action of Hypophysin in a Cat

In cases of atony of the uterus in cats Schmidt[7] succeeded in one case by subcutaneous injection of hypophysin, though the dose was rather low. Two fetuses were expelled within 16 hours. In another case the author was able to extract the fetus with forceps. In each case the fetuses were dead, but the dams recovered promptly.

[7] Schmidt, O. 1937. Zwei Fälle von Uterusatonie bei der Katze. *Tierärztl. Rundschau* 43:502-504.

Catarrh in Cats

Kirk (1936) says "Acute nasal catarrh undoubtedly occurs among cats. The attack will run its course in about seven to ten days." He considers all cases of nasal catarrh as infectious. In his experience cats seem to contract the catarrh at about three weeks of age. In some cases they recover within a fortnight, but in quite a large proportion of cases they become subjects of chronic nasal catarrh. The latter runs a long and persistent course, not infrequently as long as three to four months.

The symptoms are a primary, mucous, nasal discharge accompanied by intermittent sneezing; the discharge later becoming mucopurulent, and hanging about the nostrils. Affected cats then sneeze incessantly, and rub the nose with their paws. The appetite may be decreased, though, cats with chronic catarrh generally feed well. The temperature rarely exceeds 103° F.

Smythe (1934) observes that a cat in a boarding kennel may start to sneeze. Within a day or so, the other cats are doing likewise. The appetite is in abeyance. There is salivation from the mouth, and a mucoid discharge from the nose, which later becomes mucopurulent; sneezing is frequent. The throat is sore and congested; vomiting is absent. The eyes are somewhat inflamed and lachrymose. The cat shows extreme depression, and remains huddled up in the same spot for days, unless moved. With appropriate treatment the patient usually recovers. Anorexia commonly persists for five or seven days, after which the appetite is regained. This is more especially a disease of adult cats.

Dalling (1934) in the course of discussion of his paper, "Distemper of the Cat," remarked that there were amongst the imported cats for his experiments two snuffling cats. He believed that these two animals had set up an outbreak of respiratory disease in the cattery.

In all probability, nasal catarrh, or snuffles, in kittens is either a prodromal symptom of distemper, or a subclinical form of distemper, while in adult cats this condition, most likely, represents a chronic form of distemper.

Treatment consists in clearing the nostrils of moist or caked discharge and the instillation into the nasal passages, twice daily, of a few drops of medicated liquid paraffin, containing ephedrine 0.75%, and menthol, eucalyptol, and camphor together 0.5%, or the inhalation of medicated steam.

References: Nos. 55, 171 and 263.

Hepatitis in Cats

In cats one encounters frequently a disseminate, purulent hepatitis, characterized by nodule-like areas throughout the liver tissue. The nodules are of uniform size, about the thickness of a millet seed or pea seed, and irregularly round. They contain a rather dry, cheese-like pus, giving them the appearance of tubercles. The lymph glands are free from nodules, and there are no other areas suggestive of tuberculosis. The liver is often considerably enlarged, dark-red or greyish-red spotted and occasionally indurated. Usually, the spleen too is considerably enlarged, and sometimes permeated with yellowish areas.

In all probability this condition is due to an infection with emboli-forming pus bacteria, carried by the portal vein. The bacteria gain entrance from lesions of the mucosa inflicted by intestinal parasites.

Reference: *Kitt, Th.* (Lehrbuch der pathol. Anatomie der Haustiere. Stuttgart, 1923).

The stomach of the cat has a capacity of 2 to 2¾ gills. (250-350cc).

Schoop (1936) attempted to transmit infectious encephalitis of foxes to a cat, using brain suspension from natural cases, but failed.

Some investigators claim that cats are more often infected with trichinella than pigs. Hall states, it is possible that these worms are not as uncommon as our lack of records would indicate, the lack of records in this case being for the most part due to the lack of examination for parasites and a failure to publish the findings when examinations are made.

Feline Infectious Enteritis

By E. E. LEASURE, Manhattan, Kansas
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Feline infectious enteritis is an acute, highly contagious, epizootic, febrile disease of young, and occasionally of old, cats.

This disease has been called feline distemper, gastroenteritis, feline typhus, epizootic enteritis, croupous enteritis, cat enteritis, and many other names.

Etiology

The causative agent is a filterable virus, (feline infectious enteritis virus). No visible microorganism isolated from cats having died of the disease is capable of reproducing the disease. All such organisms, therefore, are considered to be only secondary invaders.

Natural or field infection occurs by direct contact with sick animals, or by indirect exposure to contaminated quarters, litters, dishes, or other substances. The incubation period resulting from natural infection is variable and is believed to be between six and 14 days. The incubation period following artificial infection is four days, death usually occurring by the ninth day. The death rate for both the natural and artificially infected cats is quite high, reaching 92% or more.

Symptoms

The symptoms presented by sick cats vary greatly, and thus at times are quite confusing to the clinician who does not have ample time to observe his patient. The following symptoms are frequently observed but are not always found in the affected individual:

Fever.—The temperature ranges from 104° F. to 108° F., the average being about 106° F.

Inappetence.—This is an early symptom, the cat refusing all food and water.

Coat.—The coat is rough and unkempt, dehydration is common resulting in a loss of normal skin tone.

Diarrhea.—This is a frequent but not constant symptom. When present the feces are tinged with blood or dark and quite mucilaginous.

Emaciation.—Loss of flesh may be quite rapid or death may occur before loss of weight is apparent.

Depression.—The affected cat is always listless and depressed and prefers not to be handled or disturbed.

Vomition.—Retching may be quite severe at times. Vomiting is a frequent, but not necessarily constant, symptom.

Pain.—During abdominal palpation pain is frequently manifested.

Anemia.—The affected cat frequently becomes anemic, especially toward the end of the disease.

Position.—The common position is a ventral recumbency with hind limbs stretched out, abdomen flat on the ground, and head drooping so that the nose frequently touches the ground.

Discharges.—A clear watery or thick brownish discharge may be observed from the eyes and nostrils.

Autopsy

The autopsy lesions are as a rule fairly constant, even in very acute cases.

The stomach presents no constant lesions and is seldom observed to be affected.

The small intestine almost without exception presents lesions that vary from those of a simple congestion to those of an extensive pseudomembranous enteritis with congestion, hemorrhage and necrosis. The submucosa is frequently edematous and the serosa reddened.

The large intestine may present a congested mucosa, is usually empty, or may contain a dark, blood-tinged mixture of feces and catarrhal exudate.

The liver may be slightly swollen and congested, or mottled in appearance.

The spleen is usually swollen, congested and hemorrhagic. The hemorrhages may appear along the borders or deeply within the organ.

The kidneys may appear swollen and congested or present no visible lesions.

The lymph nodes, especially the mesenteric, are usually swollen and sero-hemorrhagic.

The lungs present no lesions of importance.

The heart usually presents lesions of muscular degeneration.

Immunization

Immunization, according to our experimental findings, may be successfully produced by (1) the injection of two to four cubic centimeters of formalized tissue vaccine subcutaneously and (2) the simultaneous injection of feline infectious enteritis virus and homologous hyperimmune antiserum.

The formalized vaccine is made from the organs (preferably the spleen) of young cats that died of the disease.

The dose of virus is 2cc and for the serum 10 to 15cc. Both are given subcutaneously.

Diagnosis

The diagnosis of feline infectious enteritis is at times most difficult, and in such cases the clinician should advise hospitalization, so that the patient may be observed. If this is not possible the patient should be returned at frequent intervals until a diagnosis may be arrived at. The diagnosis is dependent upon symptoms presented and the history.

Treatment

Feline infectious enteritis, like a good many other virus diseases, does not always respond to treatment. It is, however, possible to benefit a large number of affected cats, if a diagnosis is made and treatment started early enough. Cats affected with the disease should be given 10 to 15cc doses of homologous antiserum, either subcutaneously, intravenously, or intraperitoneally at 12 to 24 hour intervals, and as often as is necessary. If the homologous antiserum is not available, direct blood transfusions from aged or immune cats should be resorted to, the dosage being the same as for homologous antiserum.

Large doses (40-70 cc) of normal saline or glucose solution should be given, subcutaneously or intraperitoneally, at least once or twice daily, if the animal becomes dehydrated.

As convalescence sets in, the further treatment should be symptomatic. Good nursing and good food will do much to bringing about recovery.

References: Nos. 187 and 188.

Kennel Disinfection

The application of sodium hydroxide solution to areas contaminated with worm eggs or worm larvae, in amounts sufficient to alkalinize the surface to pH 12 or above, proves effective in destroying the eggs and larvae of intestinal helminths. Sixty gallons of a 2% solution of household lye are sufficient to treat an area 20 by 30 feet. The treatment is to be repeated, as recontamination of the soil takes place.—*E. C. McCulloch.*

Paralysis in The Cat

Kirk states that it is not an uncommon occurrence to see a cat, suffering from complete or incomplete, local or general paralysis brought to the surgery, with no useful history or indication as to its cause.

Discussing the etiology he says that paralysis may arise from lead or mercurial poisoning, uremic poisoning, or from the absorption of toxins formed within the body. Obstinate constipation, especially, is a notorious cause of paraplegia, and doubtless produces its effect through autointoxication.

McLaughlin observed that cats exhibiting a partial or complete paralysis of the hind legs suffered also from an inflammation of the lower bowel.

Wolffhügel reported paraplegia in cats caused by metastrongyle invasion of the bloodstream.

If the case is at all amenable to treatment, effort must be directed toward the restoration of nervous energy to the group of muscles involved. The galvanic current applied twice daily over a prolonged period seems to exert a salutary effect in some cases. The bowels must be regulated and maintained rather lax.

Reference: No. 156.

Distemper of the Cat

IN cat distemper, according to Dalling, the prevailing symptom is an inflammation of the nasopharyngeal cavity, producing generally a serous exudate from the nose which often becomes mucopurulent. This inflammation may spread to the larynx, trachea, bronchi, and the lungs during the course of the disease. In such cases lesions vary with the severity and extent of the infection. It is not uncommon to find well developed cases of bronchopneumonia, in the course of an initial distemper infection. In some cases a glossitis seems to be the most pronounced affection; in others, conjunctivitis with subsequent discharge of a serous or mucopurulent nature. In some cases the eye and the eyelids may be involved in part or in their entirety.

Smythe gives the following symptoms of distemper: Prostration, salivation, sneezing, profuse greenish mucoid discharge from the nostrils, loss of appetite, and lachrymation. Citing a case report of a two-year-old cat and her contact with others, he stated that the conjunctiva became intensely inflamed and swollen; the swelling protruded between the eyelids. Later a diphtheritic deposit formed, and the conjunctiva of the upper lid became adherent to that of the lower, completely closing the eye, and requiring surgical interference. In due course the cat and most of the kittens recovered, but the kittens were permanently affected with snuffles and a nasal discharge. There was some evidence to show that some of them remained carriers of the disease for a year or longer.

Zwick summarises the clinical symptoms as follows: The initial stage is loss of appetite, retching, vomiting, depression. This condition is complicated by purulent conjunctivitis, purulent rhinitis, sneezing, coughing, labored breathing, diarrhea, the uttering of cries, weakness, anemia, and symptoms of coma with falling body temperature towards the lethal end. Distemper exanthema and nervous symptoms do not seem to occur in cats.

Chirila states that distemper in cats exhibits a plainly manifested catarrhal inflammation of the mucous membranes. Clinical examination reveals fever (40.7° C.), nasal secretion, conjunctival discharge, and diarrhea.

Discussing differential diagnosis, Krembs and Seifried mention that cat distemper is characterized by a severe gastroenteritis of a catarrhal nature. Lesions in the larynx or in the tonsils do not exist. Blepharo-conjunctivitis and rhinitis are often present; bronchopneumonia is rarely encountered. Distemper, as a rule, attacks young cats only; mortality is about 20%.

Artificial infection is accomplished with virus from sick dogs as well as from sick cats. Young cats are more susceptible to the virus of sick cats than to the virus of sick dogs. The infection is transmitted much easier with blood or emulsion of nerve substance and spleen tissue, than through secretions and excretions of the diseased animals. Inoculation of the virus intradermally, subcutaneously, intracardially, and intracerebrally produces 100% of lethal cases. The incubation period in artificial infection is two to six days; under natural infection the incubation period is six to eight days. The anatomical lesions in artificial and natural infection are identical. Recovered cats acquire a strong immunity. Dalling, on the contrary, remarks that the opinions differ. Some investigators say that a distemper attack does not convey immunity, because cats which have recovered are subject to a new attack with all the typical symptoms of distemper.

It is not unusual to find that cats which have recovered from distemper retain permanently a form of chronic catarrh of the nasopharyngeal cavity. Old cats seldom succumb to the disease, but there are occasional outbreaks in which the mortality of all ages is high. There is no satisfactory vaccine or serum against this disease.

Distemper occurs often in an enzootic form in certain cat kennels, in which nearly every susceptible cat succumbs to it.

References: Nos. 55, 57, 149 and 263.

Furunculosis

The sites most commonly affected with furuncles are the back and the tail, especially at the root. In the latter case a definite drouping of the tail is noted. Affection of the legs is characterized by lameness. Predisposing causes for this condition are usually traumatism, such as bruises, bites, and other contaminated wounds.

The condition is chronic and does not respond readily to ordinary medical treatment. If the ailment is generalized, the patient becomes very emaciated, the appetite poor. In many cases the patient succumbs to acute septicemia.

Miss Jordan reported an interesting case of a septic bite in a four-year-old neuter ginger cat. The symptoms noted on presentation were inappetence, disinclination to move and stiffness of hindquarters. The temperature appeared normal. The second morning following hospitalization, a swelling appeared above the right eye; when lanced, thick, cheesy pus exuded from a cavity that extended right down the side of the face, nearly to the jaw. The next day the right foreleg became affected; the following day the left foreleg. Pus was oozing out of the toe of one hind foot. The next day the cat was definitely in pain when moved. Two patches of necrosis had appeared on the tongue. Destruction of the animal was recommended.

Miss Shedlock states that abscesses of the back and root of the tail present the greatest difficulties for treatment. She recommends shaving the fur all around the affected parts, and curetting the abscesses, removing all necrotic tissue. A probe should then be passed all around the edge of the wound to make sure there is no channel for further pocket-formation or pus-production. The wound should be allowed to heal slowly.

Livesey disagrees with the foregoing method. He advises to leave an abscess to mature until it is nearly ready to break open, when it may be opened and syringed. He cautions against injuring the abscess wall which is nature's defense and effort at localization.

Often, however, intercellular infiltration seems to take place, despite all precautions. When one abscess wound heals, another abscess forms near it. This may continue for several months. When the abscesses continue to form down the tail, it is best to amputate the tail. The affected parts should be kept bandaged all the time, so that the patient cannot gnaw at them, and spread the infection to other parts of the body.

Bower recommends giving a general anesthetic, dissecting away all dead tissue, and curetting deeply; then, if possible, a wet pack of Dakin's solution, which should be changed every four to six hours, is placed in position. After a few such applications the tissues take on a healthy appearance and any stimulating healing powder or lotion will suffice.

References: Nos. 20, 150 and 256.

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Morbus Banti-like Disease in Cats

Janin (1929) described a disease in cats which was characterized by recurring abscesses on the tail, which healed under treatment. After a certain lapse of time a relapsing ascites developed. Finally, death took place rather suddenly. Autopsy findings disclosed the existence of splenomegaly and hepatomegaly. The spleen weighed 230gm; its capsule was thickened, the tissue firm and of a dark, red color. The liver weighed 165gm; its surface appeared reddish-yellow, and simulated hog liver in outline. The pleura was thickened considerably.

Macdonald (1933) examined a male cat, about nine years old. The animal seemed to be enlarged abdominally and had a history of being sick occasionally. The general condition was good. Palpation revealed an enlargement on the floor of the abdomen, extending from the diaphragm to the pelvic brim. The enlargement was freely moveable, and roughly square in shape. The autopsy revealed a huge spleen, weighing 16½ ounces (513gm).

Reference: No. 149.

Diseases of the Eye and Related Structures

CATS are born with their eyelids shut; they open eight to nine days later. Kirk says that the cat is not frequently afflicted with eye disorders, but when such do occur, it is generally in association with, or as a result of, specific diseases.

Conjunctivitis Neonatorum

When kittens first open their eyes, the conjunctivae are sometimes found to be reddened, swollen, and bathed in a thick yellowish pus. This condition is believed by some observers to be a symptom of distemper. Kirk has known numerous instances of its presence having been unaccompanied by any other lesion or symptom which one ordinarily expects to be associated with distemper. Gray has stated that this obstinate condition is often enzootic in a cattery. Nicolas considers conjunctivitis a very common disease in the kitten. It may manifest itself either before, or very soon after the eyelids have separated. Some queens never bear young free from this complaint. The dam usually shows some, though probably slight, catarrhal conjunctivitis. If this inflammation develops in kittens before the eyes are open, it nearly always destroys the sight.

Symblepharon

Dowland observed a kitten, about four months of age, suffering from "weak eyes." Examination disclosed a severe purulent conjunctivitis of both eyes with considerable corneal opacity. All four eyelids, and particularly the upper pair, were too short by about one-third; the external extremities of the tarsal cartilage being over the middle of the outer third of the horizontal meridian. From each of these points, skin lined with conjunctiva, grew down to near where the external canthus should normally have been. On this location, the furred skin of the face grew on to the sclera, almost up to the margin of the cornea. Above and below, this fur-bearing skin was continuous with the conjunctiva, the junction being quite apparent. The conjunctival sac, which in the cat is well marked in the region of the outer canthus, was in this case entirely absent—the skin of the face just grew on to the eyeball. The owner strongly desiring treatment, a plastic operation was decided upon.

The flap of furred skin was first dissected off the eyeball, and carefully separated from the adjacent conjunctiva. It was then split horizontally. The two ends of conjunctiva thus formed were drawn towards the external canthus, and then sutured together. It was realized that this was a clumsy expedient, but it was felt that nothing else could achieve the desired result, and that so much irritation already existed in the conjunctiva that the effects of a little more would not be noticeable. The upper lid, which was turned inwards, was then strongly everted. To minimize ill effects of the suture within the outer canthus of the eye, the eye was kept well filled with ointment of yellow mercuric oxide for the four days during which the sutures were in position. The separated ends of the conjunctiva healed together, forming quite a well-marked, small reflection under the external canthus. The skin which had been reflected back off the eyeball joined up to the edges of the true eyelid, and to the free edges of the conjunctiva which had been drawn together by the suture. The conjunctivitis entirely disappeared, and the corneal opacity cleared up. The lids functioned well; but gave the kitten a peculiar appearance.

Entropion

Milks says that entropion may involve either one or both lids of the same eye and may occur simultaneously in both eyes. The symptoms are those of a severe conjunctivitis or keratitis as would be expected from contact of the hair with the eyeball. The history of a long-standing eye trouble should always cause one to suspect entropion. Diagnosis is made from a careful examination of the patient. There is the usual persistence of inflammation of the eye; upon close examination the lids will

be seen to turn in. Unrolling the lids will often help the diagnosis. Treatment must vary greatly according to whether one or both lids are involved, and owing to the amount of entropion.

Exophthalmus

F. Bloom obtained the history of a nine-year-old, castrated cat, the eyelids of the right eye of which had been swollen for 10 days so that the eyeball could scarcely be seen. On examination the palpebral conjunctiva of the right eye was greatly thickened and presented a gaping appearance (chemosis). There was injection of the conjunctival blood vessels; the conjunctiva itself was of a dull, brick-red color. The membrana nictitans was also greatly thickened and protruded anteriorly and laterally to the external canthus. There was a slight mucoid discharge from the eye. The cornea could barely be seen on separation of the lids, but appeared normal. The condition did not improve under treatment. It was noticed that the eyeball seemed very tense and was more or less fixed in the orbit.

An ophthalmologist was consulted and a final diagnosis of exophthalmus was made. The chemosis and collateral edema increased during subsequent days. The physical condition of the animal became very poor; the cat lost weight and appeared toxic. A blood count was made. It was then revealed that the animal suffered from a lymphadenosis with leucemic infiltrations of the orbit, which were responsible for the exophthalmus.

Amaurosis and Amblyopia

Schreck believes that amaurosis and amblyopia in the cat is of the nature of an atony or paresis of the optic nerve.

Dacryocystitis

Inflammation of the lachrymal sac is not uncommon in cats. It occurs as an acute or chronic condition. As a rule, in the lower inner angle of the eye, according to the position of the lachrymal sac, one finds a distinctly fluctuating, sack-like tumor, of varying size, situated along the rim of the lower lid. It is caused by the collection of lachrymal secretion. On pressure the content of the sac discharges into the inner angle of the eye. The content consists of thick, purulent mucus, brown to yellowish red in color. The eyelid is slightly edematous and inflamed. Often a catarrhal conjunctivitis coexists, and the continual flow of the secretion excoriates the skin of the lower eyelid to varying degrees.

Microblepharon—Tuberculosis

Other eye conditions in cats, mentioned in the literature are congenital smallness of the eyelids, and tuberculous infection of the eyelids.

References: Nos. 19, 64, 156, 212 and 248.

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According to Mr. J. M. Loughborough, secretary of the International Cat Society, there are 120,000,000 cats in the United States, or approximately one cat for each man, woman, and child. New York alone has about 7,000,000. Mr. Loughborough estimates that 65% of all the cats in the U. S. are "strays."—(*J.A.V.M.A.* 32:808.)

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Constipation and Diarrhea

Old cats are very subject to constipation, but it can be controlled by rational feeding and regular doses of sweet oil with an occasional laxative pill. Diarrhea is the most common and troublesome condition in the raising of kittens. It easily leads to incurable chronic intestinal catarrh, fatal enteritis, or prolapse of the rectum.

* * * *

Convulsions in Cats

Nervous explosions in cats, particularly young cats, are common. The paroxysm is usually sudden. The animal becomes greatly excited, the hair on the back and tail is fluffed. It may run about swiftly, and cry loudly. If in a room it may climb up the drapery or hide under the furniture. The excitement is continuous until the convulsion subsides.

Such paroxysms are usually a result of improper diet, intestinal parasites, or ear mites. The therapy must be directed toward the removal of the cause.

Reference: *Jour. Amer. Med. Assoc.* 103:514.

Diseases of the Urinary System

(A Survey of Recent Literature)

IN the clinical examination of the cat, the physical and chemical examination of the urine forms a valuable link between the history of the case and the final diagnosis. Zell has given an excellent discussion on this helpful subject. In the cases mentioned by him, the indican test disclosed the presence of intestinal fermentation in two cats, while other tests disclosed parenchymatous nephritis in the same cats, and cystitis in another cat.

Obstruction to Passage of Urine

Miss Lock says that urinary stoppage is a frequent problem in practice. A sure prognosis is difficult, because until it is relieved, one cannot say whether the stoppage is due to sabulous matter or a mucous plug. The sabulous cases if taken in time do well, but will recur again and again. The cases due to a mucous plug are usually fatal, as the cat remains unable to relieve himself probably for several days, the urine being thick and full of mucous. Attempts to relieve the stoppage by pressure on the bladder have, in one or two cases, terminated in rupture of the bladder. Pressure, therefore must be used with caution. First an attempt should be made to dislodge the impaction by inserting a fine probe via the urethra. Failing in that the urethra is incised with a fine, sharp scalpel, laying it open along one-half its external length; this heals open, and often prevents recurrence of stoppage.

"White Kidney" Disease

Kirk mentioned a black-and-white short-haired cat, aged eight years which was very thin, although in other ways it seemed fairly normal. On palpation of the abdomen two enlarged kidneys were felt. The condition was suspected to be "large white kidney;" consequently, destruction was advised and carried out. The two kidneys when removed weighed six ounces—six times the normal weight for a cat of that size. The cut surfaces of the kidneys showed practically no normal renal tissue; but numerous large veins running in all directions and contrasting strongly with the white background. Also there were black areas beneath the capsule, suggestive of cavities filled with disintegrating blood.

Hydronephrosis

Miss Shedlock mentioned a year-old neutered female Siamese cat that was very listless, had no appetite and vomited bile frequently. The temperature was 102.5° F. The animal was spoonfed and given dimol twice daily. Vomiting ceased, bowels were slightly relaxed, the temperature fluctuated between 101.5° and 102.5° F., and all food had to be given with a spoon. At the end of a week the temperature sank to 100°F. Owing to great emaciation, palpation of the left floating kidney was easy; it appeared somewhat large and soft. The cat became worse; euthanasia was advised. Post-mortem examination revealed hydronephrosis of the left kidney.

Cystic Kidney

Bullard reported the autopsy of a cat that was presented for examination in a state of coma. She was extremely emaciated and had a rough coat. The breath was fetid. The cat had been sick a week.

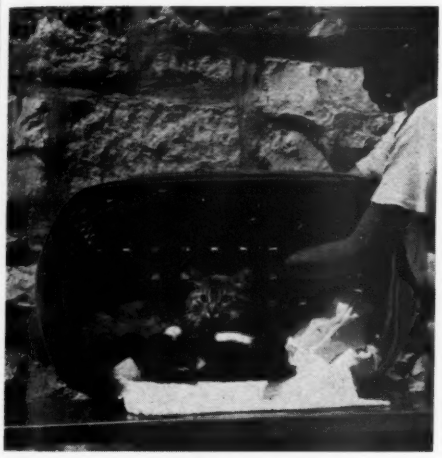
The post-mortem examination revealed that the kidneys were the seat of the trouble. The left kidney was greatly enlarged. It measured 6.5 by 9 by 5cm. There was no evidence of any normal kidney tissue present. The entire mass was one large cyst. No evidence of an occlusion or stenosis could be found in the remainder of the urinary tract. The right kidney measured 3 by 5 by 2cm. It was greyish white in color and showed an irregular surface with many contractions and scarred areas. The capsule was thickened and very adherent.

* * * *

The conclusion that cats show a surprising ability for color discrimination is erroneous. The cat perceives only shades of grey in the world.—*Gates.*

Calculus

Campbell described a bladder calculus in a neuter, seven-months-old cat, the body weight being six pounds. The cat was castrated when five months of age. Two months later the owner complained that the animal had been ill for some time, passing blood in the urine. Post-mortem examination disclosed that the castration wound had healed perfectly. When the bladder was opened it was found to contain a calculus about the size of a large pea, made up of a collection of hundreds of small pieces of gravel. The bladder itself was thickened and congested, but empty of urine. All other organs were apparently normal.



A cat proves a successful foster-mother for a litter of skunk kittens.

Bell states that urethral calculi occur more frequently in the castrated cat than in the tom, and oftener in the tom than in the female.

Spaulding observed a cat with calculi in the bladder. There was no obstruction in the urethra, but frequent straining and micturation was seen and at each attempt only a small amount of bloody urine was passed. When this dried on paper, a thick deposit of fine sand was left. The cat was given one-third grain of azamine thrice daily, and in four days evidence of the gravel ceased. The treatment was discontinued, but the bladder condition became evident again in a short time, so the cat was kept on one or two one-third grain capsules daily over a period of a month. The ailment did not recur.

References: Nos. 13, 31, 37, 170, 193, 256 and 267.

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Streptothricosis in a Cat

A cat which a few months previously suffered from a vaginal discharge was observed to have an enlarged abdomen just shortly before death. Necropsy revealed a purulent peritonitis, and mastitis. In the purulent fluid were found whitish granules. Microscopical examination revealed staphylococci and long, fine, branching threads which were gram-positive[6]. Cultures upon Sabourand medium developed weak colonies, consisting of threads. In a second cat which four months before death exhibited a large abscess on the thorax, which had developed into a fistula, pleuritis was diagnosed. In the purulent fluid of the pleural sacs whitish granules were found similar to those found in the cat previously mentioned. Granules washed in sterile saline solution were inoculated into four dogs (two intraperitoneally, one intramuscularly, and one intravenously). Two died within three days showing symptoms of septicemia. The dog injected intravenously died on the 23rd day from a pleuropneumonia. In the pleuritic exudate, granules containing fine threads were found. The dog injected intraperitoneally exhibited symptoms of ascites on the 50th day. On the 60th day the abdomen was swollen considerably, and four liters of purulent fluid could be tapped off. In this fluid the above mentioned whitish granules were found again. The microorganism forms fine, almost transparent colonies upon gelatine, in which the streptothrix remained virulent for eight days. The optimum temperature for growth lies between 33° and 36°C. Growth succeeded also on several other media. In older cultures the streptothrix formed spores.

[6] Robin, V., Lesbouyries, G., and Vecchiu, A. 1927. "Contribution a l'etude d'une oosporose des carnivores domestiques.

Paralysis of the Diaphragm

Brunke (1933) reported that a female, orange, tabby, Persian cat, age two years was presented at the veterinary clinic of the Kansas State College with a history of having developed, gradually, a dyspnea. The owner stated that the cat was off feed.

The animal showed signs of abdominal breathing, obesity, increased shallow respirations, congested membranes, general depression, but normal temperature. Exploratory laparotomy revealed the condition to be due to paralysis of the diaphragm. A handful of mesenteric fat and two lumps of fat which were found pressing against the diaphragm were removed. This operation relieved the abdominal breathing.

LaFond (1935) had in his practice a few cases of abdominal hernia in cats due to automobile injuries and dog bites. Results of operating have been unsatisfactory.

References: Nos. 67 and 180.

Prolapse of the Rectum

Cozart reported prolapse of about 2.5 inches of the rectum in a four-year-old female cat. A diarrhea had persisted for a time, following an acute gastric disturbance and this resulted in the prolapsus. The prolapsed parts were greatly swollen and inflamed, though not otherwise injured. The animal was very weak. It had eaten nothing for a few days, but later drank a little milk. It was impossible to reduce the prolapsus because of the adhesions. Amputation was resorted to. The cat was anesthetized with a mixture of chloroform and ether, and the surgical area was cleansed with a 0.05% solution of bichloride of mercury. A sound, sufficiently large to dilate the rectum moderately was introduced, and the contacting and prolapsed rectal walls were sutured, using No. 0 gut, and employing a continuous suture. Each stitch overlapped the adjoining one and was drawn quite snugly. This continued until a line of sutures girdled the prolapsed rectum; the two ends being tied together at the point of beginning. The prolapsed portion situated beyond the suture was left in situ, the sound removed, and the patient was made as comfortable as possible. After care consisted in a daily application of one part of tincture of iodine to ten of glycerine; this was applied to the prolapsed parts, including the sutured area. The patient drank a little milk and seemed to suffer no serious inconvenience following the operation. Three days after operating sequestration of the prolapsed parts was taking place and by means of gentle torsion they were removed. The sutures also were removed.

Intravenous Injections in the Cat

In the cat the technique of intravenous injection presents no great difficulties. The radial vein is selected as it passes up the antero-internal aspect of the foreleg below the elbow joint. The hair over the region should be clipped and the skin moistened with spirit to bring the vein into view.

The operation may be performed with one assistant. The cat is placed upon a table lying on its breast and abdomen. The assistant holds the animal by the skin at the back of the neck with his left hand, holding the head steady. With his right hand he extends the cat's right fore-leg by gripping it immediately above the elbow joint. Pressure from his right thumb, which is placed in front of the joint, serves to raise the vein which stands out clearly over a distance of about two inches.

A syringe with a capacity of from 2 to 5cc, according to the quantity to be injected, is a convenient one for the purpose. Needles of an external diameter of 0.6mm and a length of 13mm are suitable.

The operator steadies the extended limb by holding it just above the carpus with his left hand, while he introduces the needle (with the syringe attached) into the vein with a single thrust. Without releasing his hold upon the leg he is able to steady the syringe against the limb with his left forefinger and thumb.

The assistant releases pressure over the vein as the injection commences. The injection should be made slowly, else there is a risk of the vein ballooning just below the elbow. Five to ten seconds is a suitable period in which to make the injection.

Reference: No. 314.

Eclampsia in the Cat

PUERPERAL eclampsia in the cat, according to Reinhardt, occurs usually a few days after but occasionally shortly before parturition. Hill observed that the cases coming under his notive have occurred in young cats after their first parturition. Dildine reported a case of eclampsia in a cat which had a litter of kittens to which she had been supplying an abundance of milk for the last eight weeks. That evening the cat had eaten a good supper and had been with her kittens. About 9 p. m. it was noticed that she was very uneasy, a little stiff and unsteady behind. This condition kept getting worse until 1 a. m. When Dildine arrived the cat was stretched on her side, showing typical spasms. In a few minutes she seemed to be relaxed and tried to stand on her feet. Upon trying to examine her she immediately stiffened out, the muscles became hard and tense. The pulse was very fast, small and hard; the mucous membranes were congested. The body felt warm, especially the mammary glands; pressure on them seemed to cause pain. There was an anxious look on the face, the eyes were open, and the corneal reflex was present. The animal seemed to be able to understand commands, but was unable to obey them. The spasms appeared to be getting more severe and to be coming closer together. A diagnosis of puerperal convulsions was made. The cat was placed in a quiet place and given cannabis indica. As soon as the spasms were allayed, a tablespoonful of milk, with all the sugar it would dissolve, was fed. Milk and sugar was kept before her for two days. The kittens were immediately removed and weaned. In 24 hours the patient was apparently normal, and so remained.

Recently, Benesch described a case of eclampsia in a tabby cat, age one year, nursing three kittens. Parturition had occurred three weeks previously without difficulty. About two hours before being brought to the hospital, she was seized with peculiar spasms all over the body. The spasms increased in intensity and were accompanied by profuse salivation. Clinical examination revealed the following:

The trunk and the extremities exhibited tonic-clonic spasms characterized by twitchings of all the individual muscles. While the body was shaken by the almost rhythmical convulsions, the extremities showed a peculiar stiffening. Flexion of the legs had to overcome a distinct resistance; when the bent leg was released, it assumed its maximal extended position. Peculiar also was the temporary tension of the abdominal muscles; when the back was bent the two pairs of legs almost crossed over simultaneously. Respiration was superficial and very much accelerated. At times masticatory spasms occurred, causing foaming at the mouth; at other times the tongue was seen prolapsed through the parted lips. The slight reddening of the secreting saliva was evidently the result of injury to the tongue, incident to the spasms of the masticatory muscles; the lesions, however, affected only the surface of the tongue. The internal body temperature was 41.6°C. (106.9°F.); the pulse was accelerated, and almost imperceptible. It seemed that during these continuous convulsions the consciousness and the sensibility of the animal was perfectly normal, as indicated by the definite reaction of the cat to needle pricks and to the incision. The eyelids were open to their maximum width; likewise the pupils. The expression on the face of the cat denoted fright and pain. The cat responded to sound by raising the head lightly, and by an increased intensity of the convulsions.

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Care of the Teeth

McNair advises that the teeth of cats should be examined occasionally and any accumulation of tartar removed to prevent sore gums and decay of the teeth. Decayed teeth are to be extracted.

Euthanasia

EUTHANASIA, the killing of cats by humane methods, is a necessary phase of small animal practice. While this task, perhaps, is unpleasant to many, prestige accrues to one performing it efficiently, that is, promptly and painlessly. The methods available for sacrificing cats are many, the results are variable.

According to a report of a committee appointed by the National Veterinary Medical Association of Great Britain and Ireland, to study the subject of small animal euthanasia, the use of hydrocyanic acid alone, by any channel, is not a satisfactory method for the destruction of cats. H. S. Purchase (Molteno Institute for Research), however, favors this method. He prepares hydrocyanic acid for destroying animals in the following manner: A small quantity of solid sodium or potassium cyanide, enough to cover the last ¼ inch of a pen knife, is dissolved in 5cc of water. In another receptacle some oxalic acid is dissolved. Then the cyanide solution and immediately afterward the acid solution are drawn up into the syringe. These are promptly injected into the thoracic cavity. By this procedure one is always certain of using extremely fresh, active HCN, which is liberated in the chemical reaction between salt and acid.

Owing to the fact that morphine administered to cats usually produces excitant effects and not narcosis, this agent is unsuited for anesthetizing cats either for relief from pain or for euthanasia. Chloral hydrate, injected intrathoracically, acts more uniformly in cats. Injection of 4 to 5cc of a 50% solution provokes a general anesthesia in from three to five minutes, the onset being quick. In most cases observed by the committee, the dose was fatal, but a nine-year-old cat received 5cc with very little effect. The inexplicable variation in action of chloral hydrate as used in these cases, renders it impossible to recommend this method of destruction for cats. By intraperitoneal injection in cats, results were again more regular and satisfactory, although evidence of pain was definitely observed in some cases. Reinhardt recommends a clysma containing one gram chloral hydrate in mucilage or linseed tea, and as soon as narcosis has set in to cause death by chloroform inhalation.

In many cats it was found that administration of nembutal by the mouth was difficult In docile animals, in which oral administration could be carried out with certainty, this method was most satisfactory. Narcosis usually began in 15 minutes, and attained its maximum in one-half hour. Induction of anesthesia was not accompanied by discomfort or excitement. For cats, up to medium size, the intraperitoneal and intrathoracic route of administration are recommended, and the dose employed should not be less than one-half grain per pound body weight (0.07gm per kgm). The intravenous route of administration is recommended for cats of all sizes. The radial vein should be used and the dose should not be less than 1/3 grain per pound body weight (0.045gm per kgm). The intrathoracic injection of an appropriate dose of hydrocyanic acid in a cat anesthetized by nembutal is followed by a very brief period of increased respiration and by rapid death.

In the cat the results following the intravenous injection of fluid avertin for the purpose of euthanasia have varied. The onset of narcosis, although fairly rapid, usually occurred with no untoward results; but, instances occurred when it was accompanied by marked inspiratory convulsions during which the animal may wimper or even cry out. It is difficult to assign a cause for this, in that the technique adopted in all cases was the same, and the injections truly intravenous. Nevertheless, the fact remains that the animal may be in a state bordering on consciousness when this occurs. It can be described only as undesirable.

The bell jar method of chloroform euthanasia for cats is in fairly common use and is both simple and certain. A glass bell

jar is used, and it should be of such size that relatively free movement by the cat is possible. Chloroform is poured on to a wad of cotton wool which is then placed under the bell jar. In the opinion of the committee the process is a painless one, but unnecessarily slow. The time elapsing before the cat becomes unconscious being sufficiently long to cause it to become uneasy with its strange surroundings and the unfamiliar atmosphere.

Lethal chambers for the destruction of small animals are in use in many animal hospitals and humane society stations. They have their advantages and disadvantages, their advocates and opponents. The use of them is sometimes distressing.

J. W. Rainey observes that it is relatively easy to thrust a cat into a steel box and to walk away with ears oblivious to its muffled mewing as it more or less slowly succumbs to a narcotic vapor. To inject prussic acid or to shoot a cat calls for skill and resolution.

K. J. S. Dowland considers quietly placing a cat in a lethal chamber and slowly administering carbon monoxide the most humane method of killing.

G. K. Walker thinks carbon monoxide gas non-irritant and not unpleasant. In his opinion a properly constructed lethal chamber attached to the exhaust pipe of a motor car is effective and humane.

The captive bolt pistol is an effective method of destruction of cats. However, in this species considerable muscular movement takes place after penetration of the cerebrum. The sight is not a pleasant one. Cats are instantaneously and easily destroyed by placing the animal in a long, narrow and shallow wicker basket, having a lid made of parallel, widely spaced willow. One simply fires through a space into the head of the animal at a range of one or two inches. Error seems impossible. The only objection is the post-mortem bleeding which sometimes occurs. Any fear of return to consciousness can be removed by injecting 5cc of prussic acid into the thorax, immediately the animal is shot.

Colledge assures us that an electrical appliance for the destruction of cats is far superior in every way to any other method. The application of two electrodes, one on either side of the head, and passing through it an electric current of about 70 volts of varying amperage, gives satisfactory results. The insulating property of cat's fur is rather high, and a thorough wetting of the fur around the base of the ears with a saturated solution of common salt is essential. The action of the current produces a convulsive stretching of the body and collapse. Experience, however, seems to indicate that this method is not absolutely reliable. Often cats are merely stunned by this method and recover.

Reference: No. 314.

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Some men are mad if they behold a cat. —*Shakespeare.*

* * * *

When I play with my cat, who knows whether I do not make her more sport than she makes me?—*Montaigue.*

* * * *

It is notorious how much domestic animals vary in their mental qualities. With cats, for instance, one naturally takes to catching rats, and another mice, and these tendencies are known to be inherited. One cat, according to Mr. St. John, always brought home game-birds, another hares or rabbits, and another hunted on marshy ground and almost nightly caught woodcocks or snipes.—*Darwin* "The origin of species."

* * * *

The view of the cat's mind that many students of comparative psychology hold today is that the cat remembers no past and anticipates no distant future. It is either half dozing or else absorbed in reacting to those things present. It is feeling perhaps dimly sounds, sights, impulses, its own bodily condition. The cat is no philosopher, no mechanician, no student or critic of human affairs, merely a distant relative, poverty-stricken with respect to the most valuable of all possessions, but cherished for its air of aloofness and that aura of mystery which surrounds it.

Feline Pasology

	Single dose
Acetanilidum	0.1—0.25
Acidum acetylsalicylicum	0.5—2.0
Acidum boricum	0.5—1.0
Acidum hydrochloricum	0.1—0.2
Acidum salicylicum	0.05—0.2
Acidum sulphuricum	0.05—0.1
Acidum tannicum	0.05—0.2
Aloes	0.05—0.2 (s)
Alumen	0.25—1.0
Ammonii bromidum	0.25—0.5
Ammonii chloras	0.1—0.3
Antipyrina	0.2—0.5
Argenti nitras	0.005—0.02
Atropinae sulphas	0.002—0.005
Bismuthi oxynitras	0.25—0.5
Calcii carbonas	0.2—1.0
Calcii phosphas	1.0—2.0
Camphora	0.1—0.5
Cantharides	0.01—0.05
Chloralis hydras	0.25—2.0
Digitalis folia	0.05—0.2
Ether	0.2—1.0
Ferri reductum	0.01—0.05
Ferri sulphas	0.01—0.05 (p)
Hydrargyri choridum corros.	0.002—0.005
Hydrargyri chloridum mite	0.01—0.05
Jalapae tuber	0.2—0.5
Kamala	0.5—2.0
Linum	1.0—2.0
Liquor potassae arsenicae	0.05—0.1
Magnesii oxidum	0.2—1.0
Magnesii sulphas	2.0—5.0
Naphthalinum	0.05—0.2
Nembutal	0.1 (n)
Oleum camphorae	1.0—5.0
Oleum morrhuae	5.0—10.0
Oleum ricini	10.0—20.0
Opium	0.05—0.2
Phosphorus	0.0001—0.0002
Potassii bromas	0.25—0.5
Potassii iodidum	1.0—0.2
Secale cornutum	0.2—1.0
Fld. Ext. Secale cornutum	0.1—0.5
Sennae folia	1.0—2.0
Sodii bicarbonas	0.2—1.0
Sodii bromas	0.25—0.5
Sodii carbonas	0.1—0.2
Sodii chloras	0.5—1.0
Sodii salicylas	0.1—0.25
Sodii sulphas	0.5—1.0
Spiritus camphorae	1.0—5.0
Strychninae nitras	0.0005—0.001
Sulphur	0.05—0.1
Tartarus stibiatus	0.02—0.05
Tinctura cantharidis	0.05—0.1

(a) stomachic dose; (l) laxative dose; (p) plastic dose; (n) narcotic dose; (c) styptic dose.

Comparative Doses.

The general rule is that if the dose for the horse be regarded as one, the dose for a medium sized cat is 1/32, or about one-half the minimum dose for dog of average size.

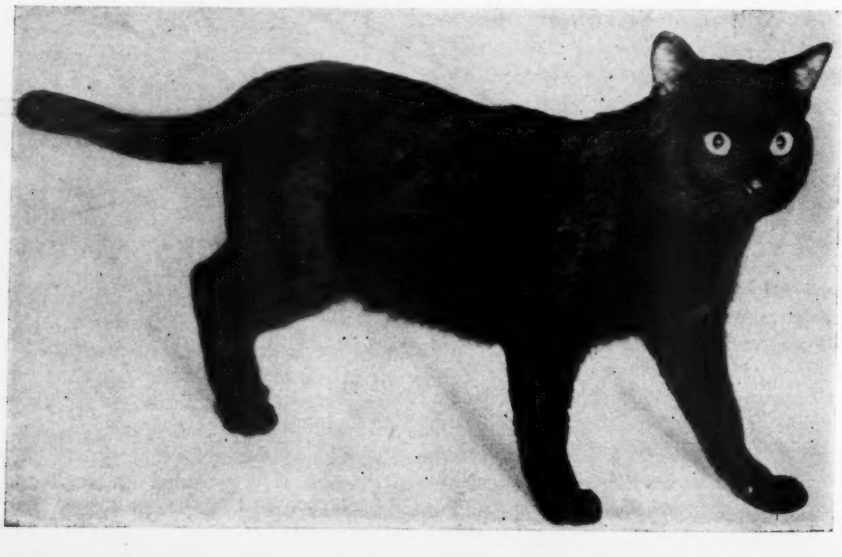
In regard to age the proportions are as follows:

Adults, six months and upward	1 part
Three to six months	1/2 part
Two to three months	1/4 part
20 to 45 days	1/8 part
10 to 20 days	1/16 part

If the dose by the mouth be 1:

The rectal dose is	2
The subcutaneous dose is	1/10
The intratracheal dose is	1/20
The intravenous dose is	1/25 to 1/50

C. G. Saunders.



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J.H.=Journal of Helminthology, Keppel St., London W.C.1., England.

J.P.=Journal of Parasitology, 615 N. Wolfe St., Baltimore, Md.

N.A.V.=The North American Veterinarian, Evanston, Illinois.

V.J.=Veterinary Journal, 7 & 8 Henrietta St., Covent Garden, London W.C.2, England.

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Other abbreviations are in themselves sufficiently explanatory.

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